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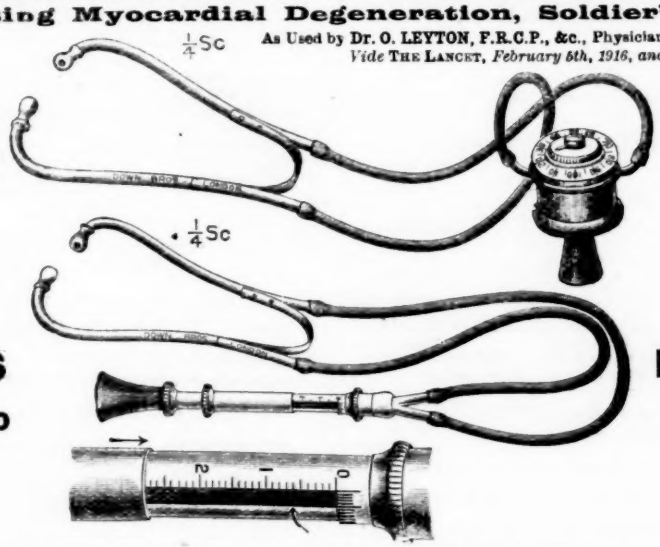

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CONTENTS.

The whole of the literary matter in THE LANCET is copyright.

HUNTERIAN LECTURE on the Bladder in Gunshot and Other Injuries of the Spinal Cord. Delivered at the Hunterian Society, by J. W. THOMSON WALKER, M.B. Edin., F.R.C.S. Eng., Surgeon to the King George Hospital: Consulting Urologist to the Star and Garter Hospital; Assistant Surgeon to St. Peter's Hospital.—*(Illustrated)* 173

ORIGINAL ARTICLES.

A Method of Concentrating Entamœba Cysts in Stools. By J. W. CROPPER, M.B.; M.Sc. Liverp., and R. W. HAROLD ROW, B.Sc., F.L.S., F.Z.S., Assistant Lecturer and Demonstrator in Zoology in the University of London, King's College.—*(Illustrated)* 179

A Case of Suppurative Meningitis with Glycosuria Simulating Diabetic Coma. By FRANK E. TAYLOR, M.D., B.S., M.R.C.P. Lond., F.R.C.S. Eng., D.P.H. Camb., Pathologist and Bacteriologist to the Queen Alexandra Military Hospital, Millbank; Lecturer on Bacteriology, University of London, King's College; and W. H. MCKINSTRY, M.B., C.M. Glasg., D.P.H. Lond., Temp. Captain, R.A.M.C.—*(Illustrated)* 182

The Recurrent Type of "Trench" Fever in Mesopotamia. By C. F. COOMBS, M.D. Lond., M.R.C.P. Lond., Captain, R.A.M.C. (T.F.); lately Attached to Indian Expeditionary Force "D." 183

A Preliminary Contribution on "P.U.O. (Trench Fever)." By F. C. DAVIES, M.B. Camb., M.R.C.P. Lond., Captain, R.A.M.C. (T.C.); Temporary Officer in Charge, Medical Division, No. — General Hospital; and R. P. WELDON, L.R.C.P. & S. Irel., Captain, R.A.M.C. (T.C.); Pathologist, No. — General Hospital..... 183

CLINICAL NOTES:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

Acute Pneumonia with Hyperpyrexia, followed by Heart-block. By J. PORTER-PARKINSON, M.D. Lond., F.R.C.S. Eng., Senior Physician at the London Temperance Hospital and at the Queen's Hospital for Children, Hackney-road, E. 184

A Case of Foreign Body in the Rectum. By N. S. BOYARD, M.D., late Senior House Surgeon, French Hospital, London; Surgical Officer, the London Lock Hospital 185

MEDICAL SOCIETIES.

ROYAL SOCIETY OF MEDICINE:

SECTIONS OF MEDICINE, PATHOLOGY, AND EPIDEMIOLOGY:—Discussion on Toxic Jaundice in Munition Workers 185

REVIEWS AND NOTICES OF BOOKS.

The Diagnosis and Treatment of Heart Disease. By R. M. Brockbank, M.D. Vict., F.R.C.P. Lond. Second edition 187

Clinical Disorders of the Heart Beat. By Thomas Lewis, M.D. Lond., F.R.C.P. Lond. Third edition..... 187

The Cure of Obesity and Obese Heart. By J. S. Kellett Smith, F.R.C.S. Eng. 188

Eclipse or Empire? By Herbert Branston Gray, D.D. Oxon., and Samuel Turner..... 188

British Journal of Inebriety.... 188

LEADING ARTICLES.

INFECTIVE AND TOXIC FORMS OF JAUNDICE 189

GUNSHOT INJURIES OF THE SPINAL CORD 190

ANNOTATIONS.

Less Beer and More Bread 191

The Prescribing of Cocaine 192

An American Opinion on Birth Control 192

The Serum Treatment of Spirochætosis 192

Climate and Health 193

Histological Changes in the Spinal Cord following Bullet Wounds 193

Royal British College of Nursing 194

Juvenile Delinquency 194

SPECIAL ARTICLES.

The Control of Venereal Diseases 195

The Services 197

PUBLIC HEALTH.

Reports of School Medical Officers 196

URBAN VITAL STATISTICS:

English and Welsh Towns..... 197

Scotch Towns 197

Irish Towns..... 197

CORRESPONDENCE.

The Phenomena of Anaphylaxis (Dr. W. W. C. Topley, Major A. S. Leyton, R.A.M.C.(T.F.)) 198

Definition of Acute Alcoholism (Dr. W. C. Sullivan) 199

The State Octopus and the Medical Profession (Mr. Charles A. Parker) 199

Spirochætal Jaundice (So-called Weil's Disease) (Dr. Arthur F. Hurst) 200

Passive Hyperæmia in Wound Treatment (Captain R. L. Gamlen, I.M.S. (retd.)) 200

The Prevention of Venereal Diseases (Dr. Robert R. Rentoul) 204

The Conservative Treatment of Burns and Scalds (Mr. Christopher Kempster) 204

THE WAR.

The Casualty List 200

Deaths among the Sons of Medical Men 200

The Honours List 200

Mentioned for Distinguished Services 201

Central Medical War Committee 201

The Transference of the Training Establishment of the Royal Army Medical Corps... 201

Treatment of Burns and Scalds in the Navy..... 201

The Red Cross 202

Ambulances for the Balkans 202

The Baths of Sidmouth (Devon) 202

The Wounded Allies Relief Committee 202

MEDICAL NEWS.

Brighton Hospital Sunday. 188

Hastings and Mentally Defective Children 188

Dublin University Election 194

Bart House V.A.D. Hospital, Burnham, Somerset 197

Hospital Sunday at Plymouth.. 197

The College of Nursing, Limited..... 200

Royal College of Surgeons of England: Pass list 202

Royal College of Physicians of London: Meeting of Comitia 202

Röntgen Society 202

Scottish Poor-law Medical Officers' Association 203

INDEX.

VOL. II., 1916 ..... iii.-xxiv.

TITLE-PAGE.

(See Notice on p. 194)

Appointments.—Vacancies 203

Births, Marriages, and Deaths . 203

Notes, Short Comments, and Answers to Correspondents .. 204

Medical Diary 205

Editorial Notices 205

Manager's Notices 205

Meteorological Readings 205

Acknowledgment of Communications received 206

FOR INDEX TO ADVERTISEMENTS SEE PAGES 2 & 4.

JOHN BALE, SONS & DANIELSSON, LTD.,

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INDEX

MEDICAL AND OTHER BOOKS AND PUBLICATIONS

PAGE

BAILLIERE, TINDALL & COX:—
Aids to Obstetrics ... 3
Beddoes' Prescribers' Formulary and Index of Pharmacy ... 3
Blake Knox's Military Sanitation and Hygiene ... 3
Childe's Surgical Nursing and Technique ... 3
Fitzwilliams' Practical Manual of Bandaging ... 3
French's Medical Laboratory Methods and Tests ... 3
Gadd's Synopsis of the B.P. 1914.. 3
Gardner's Surgical Anæsthesia ... 3
Gardner—Manual of Surgical Anæsthesia ... Cover 1
Hayes—Intensive Treatment of Syphilis and Locomotor Ataxia by Aachen Methods ... Cover 1
Ince's Latin Grammar of Pharmacy ... 3
Lake's Diseases of the Ear ... 3
Lamb's Throat, Nose and Ear.... 3
Langdon Frown's Physiological Principles in Everyday Treatment ... 3
Lockhart-Mummery's After-Treatment of Operations ... 3
Minett's Diagnosis of Bacteria and Blood Parasites ... 3
Moor & Partridge—Aids to Bacteriology ... 3
Morison's Disorders of the Heart 3
Muter's Analytical Chemistry 3
Tait & Krause—Aids to Physiology ... 3
Walsh's Diseases of the Skin 3
Williams' Minor Maladies and their Treatment ... 3
Younger's Insanity in Everyday Practice ... 3

PAGE

BALE, SONS & DANIELSSON:—
Brown—Amœbic or Tropical Dysentery ... 1
Calmette—Venoms, Venomous Animals, and Antivenomous Serum Therapeutics ... 1
Daniels—Studies in Laboratory Work ... 1
Daniels—Tropical Medicine and Hygiene ... 1
Simpson—Tropical and Sub-Tropical Climates ... 1

CASSELL & CO.:—
Walker—Surgical Diseases, &c., of Genito-Urinary Organs.. Cover 1

CHURCHILL, J. & A.:—
Davies' Minor Surgery .... Cover 1
Hare—Alcoholism ... Cover 1
Hull—Surgery in War .... Cover 1
Lelean—Sanitation in War Cover 1
Rowlands & Turner's Operations Cover 1
Squire's Companion to the British Pharmacopœia ... Cover 1
Taylor's Operative Surgery Cover 1
Warren's Text-Book of Surgery Cover 1

CONSTABLE & CO:—
Battle—The Acute Abdomen 6
Bates and Corner—Surgery of Diseases of the Appendix Vermiformis and their Complications ... 6
Burn—Vital Statistics Explained. 6
Ellis—Essays in War-Time 6
Kellogg & Doane — Economic Zoology and Entomology 6
Morgan, &c.—The Mechanism of Mendelian Heredity ... 6
Shennan—Post-Mortems and Morbid Anatomy ... 6
White—The Pathology of Growth 6

PAGE

DANIEL:—
Rabagliati—Initis or Nutrition and Exercises ... 4

FROWDE AND HODDER & STOUGHTON:—
McCann—Cancer of the Womb: its Symptoms, Diagnosis, Prognosis, and Treatment .. Cover 1
Waring—Surgical Diseases of the Gall Bladder, Bile Ducts, and Liver ... 6
Waring—Manual of Operative Surgery ... 6

GRIFFIN & CO.:—
Caird and Cathcart — Surgical Handbook ... 4
Lambert Tropical Diseases of Asia and Africa ... 4
Riddell—Manual of Ambulance .. 4

HEINEMANN:—
Romer—Modern Bonesetting for the Medical Profession .. Cover 1

KIMPTON:—
Roth—Notes on Military Orthopædics ... Cover 1

LEWIS & CO —
Carter—Elements of Practical Medicine ... 5
Delorme—War Surgery ... 5
Emery—Clinical Bacteriology and Hæmatology ... 5
Kettle—Pathology of Tumours .. 5
Lewis's Medical Ledger ... 5
Martindale and Westcott—The Extra Pharmacopœia ... 4
Murray—Rough Notes on Remedies ... 5

PAGE

LEWIS & CO.—(Continued).
Oliver, Sir Thomas—Lead-Poisoning ... 5
Parkes & Kenwood—Hygiene and Public Health ... 5
Swanzy's Handbook of Diseases of the Eye and their Treatment .. 5

MEDICAL PUBLISHING CO.:—
Lane, Sir A.—Operative Treatment of Fractures ... Cover 1

NISBET & CO.:—
Romer and Creasy—Bonesetting and the Treatment of Painful Joints ... Cover 1

SAUNDERS COMPANY:—
Bandler—The Expectant Mother. 7
Brady—Personal Health ... 7
Moynihan, Sir B.—Abdominal Operations ... 7
Moynihan's Abdominal Operations ... Cover 1
Stiles—Human Physiology... 7

WRIGHT & SONS (BRISTOL):—
Morison—Surgical Contributions from 1881-1916 ... 6

MEDICAL LIBRARIES, &c.:—
Baker—Books ... 4
Behnke—Stammering, Lisping, & Cleft Palate Speech ... 4
Ketley—Stammering ... 4
Matthews—Wood: Application of Trusses to Hernia ... 6
Scholl Mfg. Co.—Scientific Correction for Ailments of the Feet .. 9

OFFICIAL AND GENERAL ANNOUNCEMENTS

ASSISTANCIES, MEDICAL ... 55

ASYLUMS, HOMES, &c.:—
Ashwood House, Kingswinford .. 52
Barnwood House Hospital ... 49
Bishopstone House, Bedford... 52
Brunton House, Lancaster... 53
Camberwell House, Peckham-road 50
Cheadle Royal... 49
Clarence Lodge, Clapham Park .. 53
Coldhurst House School, Alderley Edge ... 53
Coppice, The, Nottingham... 49
Dalrymple House, Rickmansworth 51
David Lewis Colony, Alderley Edge... 53
Duff House, Banff ... 52
General Manager, Craven-street.. 53
Ghyllwoods Sanatorium ... 51
Grove House, Church Stretton ... 49
Grove, The, Catton, Norwich 49
Haslemere Nursing Home... 53
Haydock Lodge, Newton-le-Willows ... 50
Heigham Hall, Norwich ... 49
Homes for Inebriate Women 51
Hove, Sussex ... 53
Littleton Hall, Brentwood ... 53
London Fever Hospital... 49
Malling Place, Kent ... 49
Melbourne House, Leicester ... 51
Mendip Hills Sanatorium ... 51
Moat House, Tamworth ... 49
Newmains Retreat, Lanarkshire.. 51
New Saughton Hall, Polton, Midlothian ... 50
Nordrach-on-Dee, Banchory ... 52
Northumberland House, Finsbury Park ... 50

ASYLUMS—(Continued).
Northwoods House, Winterbourne 50
Otto House, West Kensington 53
Peckham House ... 51
Pendyffryn Hall Sanatorium, Nordrach-in-Wales ... 51
Plympton House, Plympton ... 49
Portsmouth Corporation Mental Hospital ... 53
Royal Earlswood Institution for Mental Defectives ... 50
St. Andrew's Hospital, Northampton ... 49
St. George's Retreat, Burgess Hill 53
Springfield House Private Asylum, Bedford ... 52
Stretton House, Church Stretton. 49
The Grange, near Rotherham 49
Vale of Clwyd Sanatorium ... 51
Warneford Asylum, Oxford ... 53
Wye House, Buxton ... 49

FINANCIAL, &c.:—
Equitable Reversionary Interest Society ... 47
London County & Westminster Bank... 10

HEALTH RESORTS, BATHS, &c.:—
Alexandra Therapeutic Institute. 52
Caterham Sanitarium ... 52
Droitwich Brine Baths... 52
Smedley's, Matlock... 52

HOSPITAL, INFIRMARY, SANATORIUM, &c., VACANCIES.. 52-55

HOUSE & ESTATE AGENTS:—
Bedford & Co., Wigmore-street .. 56
Elliott, Son & Boyton, Vere-street ... 56
Ley Clark, Wimpole-street ... 56

LIFE & FIRE ASSURANCES, &c.:—
General Life Assurance Co. ... 47
National Provident Institution .. 47
Prudential ... 47

MASSAGE:—
Cutter ... 47
Sharman ... 47

MEDICAL ACCOUNTANTS, &c.:—
Turner... 58

MEDICAL AGENTS:—
Fieldhall, Limited ... 57
Manchester Clerical, &c., Association ... 57
Medical Agency ... 57
Needes, J. C. ... 57
Peacock & Hadley ... 57
Turner ... 57

MEDICAL SCHOOLS:—
(LONDON.)
London School of Clinical Medicine ... 46
West London Post-Graduate College ... 46

NURSES' ASSOCIATIONS:—
Co-operation of Temperance Male and Female Nurses ... 48
Female Nurses Association 48
General Nursing Association 48

NURSES' ASSOC. (Continued).
Hospital for Sick Children... 47
London Nurses' Association 48
London Temperance Nurses Co-operation ... 48
Male Nurses Temperance Co-operation ... 48
Mental Nurses Association ... 47
Mental Nurses' Co-operation... 47
Nurses' Association ... 47
Nurses' Co-operation ... 47
Registered Nurses' Society... 48
St. John's House ... 47
St. Luke's Hospital ... 47
Temperance Association of Male Nurses, Ltd... 48
The Retreat, York ... 48

OFFICIAL NOTICES:—
City of London Lying-in Hospital ... 46
College of Preceptors ... 46
London Hospital ... 48
London School of Tropical Medicine ... 43
Metropolitan Hospital Sunday Fund... 46
North-East London Post-Graduate College ... 48
Queen Charlotte's Lying-in Hospital ... 48
Royal College of Surgeons ... 48
University of Durham ... 46

PARTNERSHIPS & PRACTICES. 56

TUTORS & LECTURERS:—
Medical Correspondence College. 47
Weymouth 48

TRADE AND MISCELLANEOUS ADVERTISEMENTS

AMBULANCES:—
St. John Ambulance — Invalid Carriages ... 8
Troon Town Council—Ambulance Waggon ... 56

BOTTLE MERCHANTS:—
Isaacs ... 8

CARRIAGES, MOTORS, &c.:—
Armstrong—Liveries ... 58
Seabrook Bros.—
R.M.C. Coupé ... 56

CHEMISTS & DRUGGISTS:—
Allen & Hanburys—
Allenburys Throat Pastilles 25
Byno Hypophosphites ... 23
Chrismol ... 24
" Capsules ... 24
" Confection ... 24
" Emulsion ... 24
Byno Chrismol ... 24
Angle-French Drug Co.—
Calyl... 32
Sterilisable Outfit ... 32
Hectine ... 32
Hectargyre ... 32
Antikamnia Chemical Co.—
Antikamnia Tablets ... 34

CHEMISTS—(Continued).
Antiphlogistine... 30
Battley & Watts—
Liquor Opii Sedativus ... 35
" Cinchonæ fort. ... 35
" Cinch. Pallidæ ... 35
" Brealis Cornuti ... 35
Boots Pure Drug Co.—
Aspirin Compressed Tablets.... 15
Phenacetin " 15
" and Caffein " Compressed Tablets... 15
Sodium Salicylate Compressed Tablets ... 15
Hexamine Compressed Tablets. 15
British Drug Houses Ltd.—
Intramine... 20
British Organotherapy Co.—
Reliable Organotherapeutic Preparations ... 11
British Oxygen Co.—
Oxygen ... Cover ii
British Purchasers—
Cystopurin ... 16
Burroughs Wellcome & Co.—
Adrenalin ... 27
Paroleine, Laxamel... 28
Hypoloid Brand Products 29

CHEMISTS—(Continued).
Christy & Co.—
Glyco-Thymoline ... 18
Glyco-Heroin ... 45
Crookes' Laboratories—
Collosols ... 12
Erasmic Co.—Kinsol Medicated Toilet Soap ... 58
Etablissements Poulenc Freres—
Stovaine... 11
Fassett & Johnson—
Emol-Keleet ... 34
Fellows Medical Manfg. Co.—
Fellows' Syrup ..... Cover iii
Gale & Co.—Elixir Cresolis c. Heroin Co., &c. ... 42
Heppells—
Urodonal ... 22
Hewlett & Son—
Mist. Pepsinæ Co c. Bismutho.. 28
Mist. Hepatica Conc. 26
Liquor Santal Flav. c. Buchu et Cubebæ ... 26
Mist. Damianæ Co. ... 26
Howards' Sodii Bicarb. ... 42
Lambert Pharmacal Co.—
Listerine ... 36

CHEMISTS—(Continued).
Mertens—
Electrargol ... 31
Enesol 31
Cacodylate of Sodium ... 31
Nourry's Iodinated Wine 31
Newbery & Sons—
Pulvis Jacobi Ver. ... 45
New York Pharmaceutical Co.—
Hayden's Viburnum Compound 12
Parke, Davis & Co.—
Glaseptic Ampoules of Sterilised Solutions for Hypodermic Use ... 19
Price's Patent Candle Co., Ltd.—
Price's Night Lights ... 43
Price's Glycerin ... 43
Raimes & Co.—Slinger's Nutrient Suppositories... 45
S. P. Charges Co.—
Sulphaqua ... 43
Squire & Sons—
Sterilettes... 21
Whiffen & Sons—Emetine 42
Wilcox, Jozeau & Co.—
Rodine ... 42
Willows, Francis, Butler & Thompson—
Mackey's Glyceroles ... 35

Continued on page 4.

Hunterian Lecture

ON

THE BLADDER IN GUNSHOT AND OTHER INJURIES OF THE SPINAL CORD.

Delivered at the Hunterian Society,

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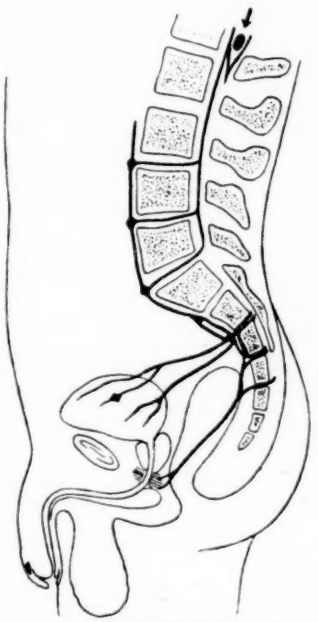
MR. PRESIDENT AND GENTLEMEN,—My first words must be those of thanks to the Council of the Hunterian Society for the invitation to address you. I had no doubt as to my strong desire to accept the invitation, but I had very grave doubts as to whether, in the present time of great stress, when there is so little opportunity for quiet consideration and accurate writing, I was justified in undertaking so important a task.

Had this been a time of peace, my inclination in addressing a society, the patron-saint of which is John Hunter, would have been to select a subject in which surgical pathology has some considerable part. But this is war-time, and I see in the subject I have chosen an opportunity of bringing before you some war-work which I hope may have a certain practical value, since it is based upon personal observation of a class of cases never before collected together in such great numbers. At the Star and Garter Hospital (65 beds) there have been altogether 111 cases, and with the exception of a very few these have been cases of spinal injury. In conjunction with my colleague, Sir David Ferrier, I have been responsible for the observation and treatment of the complications affecting the urinary organs in these cases. At the King George Hospital there have been since May, 1915, 339 cases of spinal injury in the wards of my medical and surgical colleagues on the staff and in the wards under my care at that hospital. To all of these cases I have had free access, and I seize this opportunity of offering my grateful thanks to Lieutenant-Colonel R. J. C. Cottell, R.A.M.C., officer commanding, and to Lieutenant-Colonel Donald Armour, R.A.M.C. (T.), Major Newton Pitt, R.A.M.C. (T.), Captain Sir John Broadbent, Bart., R.A.M.C. (T.), Captain Farquhar Buzzard, R.A.M.C. (T.), Captain James Collier, R.A.M.C. (T.), and Dr. Raymond Crawfurd for the opportunities they have afforded me of studying the cases under their care. I would also acknowledge my indebtedness to Major H. J. Parry, R.A.M.C., D.S.O., and to Major J. L. Dickie, R.A.M.C., for obtaining statistics of cases at the King George Hospital and the Star and Garter respectively.

FIG. 1.



Nerves passing to bladder and its sphincters.

I propose to look shortly at the anatomy and physiology of micturition. Next I shall outline the recognised variations in micturition brought about by disease and injury of the spinal cord. Then will come consideration of the cases that have come under my observation, and, lastly, some discussion of the subject of treatment.

ANATOMY AND PHYSIOLOGY.

The centre which is credited with the control over the act of micturition lies in the lumbar enlargement of the cord. Nerves pass to the bladder in two groups—a lumbar group and a sacral group. (Figs. 1, 2.) The lumbar nerves issue from the cord in the third, fourth and fifth lumbar nerve-roots and pass through the sympathetic chain, without making connexion with the cells of the sympathetic ganglia, to the inferior mesenteric plexus. From these ganglia two hypogastric nerves pass to the hypogastric plexus. Thence filaments pass to the muscular wall of the bladder. The second group consists of two nerves derived from the second and third sacral nerves, and named the nervi erigentes. These two nerves pass straight to the hypogastric plexus, from which the fibres are distributed to the bladder. Ganglion cells are also found in the course of the nerve filaments in the muscular wall of the bladder. To these nerves may be added the pudic nerve (second, third, and fourth sacral) which supplies the compressor urethræ muscle, or external sphincter, and the perineal muscles. Recent investigators conclude that a cortical centre for the bladder is situated in the motor area, at the spot where the arm and leg centres join.

While the above is the generally accepted view, the work of Gaskell[1] shows that the centre for micturition lies outside the spinal cord, in the hypogastric and mesenteric plexuses of the sympathetic. Müller,[2] applying Gaskell's view, states that after complete separation of the bladder from the cord reflex micturition still takes place. A final decision in this matter does not appear to have been arrived at. Bechterew, in commenting on this relegation of the micturition centre to a lower level, states that though it may be shown in animals, the spinal bladder centre is so highly developed in the human being that its destruction under any conditions is followed by an abolition of bladder contraction. Justschenko[4] has shown in animals that the bladder can contract spontaneously in virtue of the ganglia in its muscular wall.

FIG. 2.

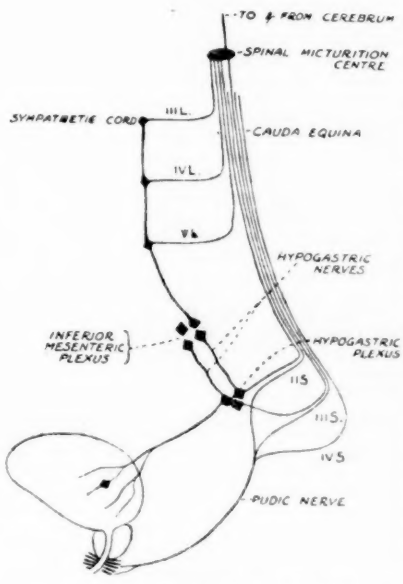


Diagram of nerves of bladder, explanatory of Fig. 1. IIIL, IVL, VL, Lumbar nerve roots; IIIS, IIIS, IVS, Sacral nerve roots.

The Act of Micturition.

The urine is retained in the bladder partly by mechanical conditions and partly by tonic contraction of the vesical sphincter. In the cadaver urine does not escape from the bladder when in the recumbent or the erect posture, and some amount of force is required to separate the elastic walls of the urethra at the vesical orifice. The male bladder is provided with a double sphincter, a non-striped or true sphincter, and a striped or external sphincter (compressor urethræ muscle). The non-striped sphincter has a constant involuntary action, but it is stated that some amount of voluntary control may be exerted over it.

Under ordinary conditions the urine is retained in the bladder by the tonic contraction of the true, or non-striped, sphincter. When, however, the pressure within the bladder becomes too great, and it is still desired to retain the urine, the true sphincter is reinforced by voluntary contraction of the external sphincter. Under certain circumstances the action of the true sphincter may be entirely abolished and the external sphincter will take its place. I pointed out[5] in 1905 that after the operation of suprapubic prostatectomy, in which the prostate and prostatic urethra are removed, the internal sphincter is inactive in the majority of cases, and the sphincter function is taken over by the striped compressor urethræ muscle.

Micturition takes place in response to impulses which pass along the reflex arc. Impulses originating in the bladder pass by the afferent nerves to the micturition centre, and from this two sets of impulses issue by way of the efferent nerves. One set exerts an inhibitory influence on the true sphincter and causes it to relax, and a second set of impulses pass to the muscular wall of the bladder (detrusor) and stimulate it to contract. The manner in which this reflex is initiated has given rise to some discussion. Two sensations are concerned: 1. As the bladder becomes filled with urine the tension of the fluid gradually increases, and the pressure exerted on the bladder wall causes increasing waves of contraction of the bladder muscle. 2. When the bladder is distended contractions of the wall become sufficiently strong to force a few drops into the sensitive prostatic urethra, from which impulses pass to the spinal centre, giving rise to efferent inhibitory impulses to the sphincter and motor impulses to the detrusor. In normal micturition both these factors probably have a place. Either may, however, alone produce the reflex act. The prostatic urethra is removed in the operation of suprapubic prostatectomy, and after the operation micturition is normally performed.[6]

Cerebral control of micturition.—The influence of the cerebral cortex on micturition is exerted in two ways. 1. A voluntary inhibition of the reflex of micturition becomes established in the child about the second year. Periodic reflex micturition, the natural state in the infant, no longer takes place, but the urine is retained until a convenient opportunity occurs, when the bladder is emptied voluntarily. When the bladder becomes distended so that the desire to micturate is strongly felt, the control becomes voluntary, and is exercised by contraction of the compressor urethræ or external sphincter, and also of the perineal muscles.

2. The voluntary part of the act of micturition consists in relaxation of the sphincter, contraction of the abdominal muscles, and the contraction of the bulbo-cavernosus muscle at the end of the act. Contraction of the abdominal muscles alone will not produce micturition, but increases the flow of urine, once micturition has commenced. Relaxation of the external sphincter is the voluntary part of the initiation of normal micturition in the adult, and this is probably sufficient in itself to induce the escape of urine into the prostatic urethra, and start the reflex act.

BLADDER STATES IN SPINAL INJURY AND DISEASE.

Before passing to consider the cases of nerve lesion affecting the bladder that have come under my observation, I will refer shortly to the bladder states that are recognised as the result of animal experiment and observation on cases of injury to, and disease of, the spinal cord.

1. *Retention of urine.*—Paralysis of the detrusor muscle, while the sphincter remains active, causes retention of urine. This condition, if prolonged, leads to retention with overflow. Less complete nerve lesions may produce delay in commencing micturition, a poorly projected stream, and dribbling at the end of micturition.

2. *Retention with overflow (passive incontinence).*—Relaxation of the bladder muscle permits the accumulation of a large quantity of urine (stated at 1½ litres, Bechterew). At length the intravesical tension becomes so great that some urine flows away. The bladder does not, however, empty itself; no reflex micturition takes place, but only the surplus beyond a certain large accumulation escapes. The condition has been looked upon as a passive incontinence, the bladder remaining entirely flaccid. Corner[7] suggests that in the moderately distended paralytic bladder rhythmic contractions continue and expel a few drops of urine every few minutes, but when the distension becomes greater the contractions cease and the overflow consists of drops of urine mechanically displaced from the bladder by influx from the ureters.

3. *Periodic reflex micturition (active incontinence).*—Here a quantity of urine accumulates in the bladder, and then the reflex act of micturition takes place and the urine is discharged. When the same quantity of urine accumulates again the reflex act is repeated. The reflex micturition cannot be voluntarily controlled either by initiating the act, or by inhibiting it, or stopping it while it is taking place. Here the state is that of the infant's bladder, cerebral control being absent. This condition is developed where there is section of the cord at any part above the lumbar micturition centre.

4. *Paralytic incontinence.*—In this state there is a flaccid bladder and atonic sphincter, and the urine dribbles away from the bladder without accumulating. This is said to develop when the lumbar centres are destroyed, and the bladder is cut off from the cord altogether.

OBSERVATIONS ON CASES OF BLADDER LESION IN SPINAL INJURY.

While the large numbers of cases of spinal lesion already referred to have come under my observation, it has been impossible in the time at my disposal to make full notes for the purposes of statistics on all the cases. I have, however, obtained detailed notes on 70 cases, and have to thank my house surgeon, Dr. A. K. Selim, for valuable help in note-taking. The condition of the urinary tract is the most important clinical factor in these cases of spinal injury. Urinary infection may be a contra-indication to operation on the spine, or it may cause death soon after an operation. It may be fatal where operation has already given promising results, or where without operation the case is showing signs of improvement in the nerve lesion. There are many points of great interest and importance in regard to the urinary organs in these cases, but I shall only have time to discuss two of these—namely: (1) Variations in the function of micturition, and (2) infection of the urinary tract.

Variations in the Function of Micturition.

Two distinct stages were observed in the cases that have come under my notice: (1) A stage of complete retention; (2) a stage of periodic reflex micturition.

1. *Stage of complete retention.*—There is a stage of complete retention commencing from the time of the injury and lasting for a varying period of time. During this time there is atony of the detrusor muscle, but the sphincter remains active. As a result the bladder is distended with urine. Careful inquiry elicits that the bladder is emptied on an average from a half to two hours before the injury, so that it probably contains a small quantity of urine when the wound is received. The shock of the spinal injury must be very considerable, and it is unlikely that during the first 6 or 8 hours after that much urine is secreted. By the end of from 12 to 24 hours, however, a considerable amount of urine has accumulated. In the great majority of cases the patient is unconscious of the fact that the bladder is distended, but in a proportion of cases the distension is felt and causes acute pain.

After a time, if the retention is not relieved by catheter, urine begins to dribble away, the bladder remaining distended and the overflow escaping (retention with overflow). I have not been able to ascertain whether this escape of urine is a trickle of fluid from the urethra as a result of pressure from the natural resiliency of the bladder wall, or whether active contractions of the bladder take place.

The catheter is passed and the bladder emptied at a varying time after the wound was inflicted. From that time catheterisation is continued at more or less regular intervals. Between the times of catheterisation the bladder becomes distended with urine, but there is no longer any escape.

The duration of this state of complete retention varies in different individuals, the shortest that I have noted being 24 hours and the longest 18 months. The average duration in 30 cases was 55 days. In one case there was said to have been no retention, and periodic reflex micturition commenced immediately after the injury. In all the others of 70 carefully investigated cases, this stage of retention was, or had been, present.

2. *Stage of periodic reflex micturition (active incontinence).*—To the first stage of complete retention there succeeds, after days, weeks, or months, a second stage of periodic reflex

micturition, which, unless improvement in the spinal lesion takes place, is the permanent state of the bladder.

(*a*) *Transition stage.*—The bladder does not, however, suddenly pass from a condition of retention with overflow, or complete retention, to one of active incontinence in its fully developed form. There is a transition period in which the bladder is still distended, or partly distended, with urine, but active contraction of the bladder wall takes place, and expels a small quantity of urine at intervals. The commencement of this period is marked by the necessity for providing a bottle to receive the urine which is discharged at frequent intervals between the times at which the catheter is passed. Very frequently at this time the catheter is omitted, although it may still be passed once a day or oftener for the purpose of washing the bladder. The bladder, which at first was distended, left to itself gradually becomes more contracted, until the quantity of residual urine left after micturition is very small, or there is none at all. The advent of cystitis hastens the contraction of the bladder and reduces the quantity of residual urine.

(*b*) *Periodic reflex micturition.*—In the fully developed second stage the bladder is a purely reflex organ. The sphincter is active, and the urine accumulates in the bladder. When the set capacity of the bladder is reached the detrusor muscle contracts, the sphincter relaxes, and the urine is discharged in a powerful stream. This is active incontinence. It is an involuntary act. The patient is unable by any effort of will to initiate the reflex, nor can he inhibit the micturition. In the majority of cases he is unaware that micturition is taking place. The bladder holds from 2 to 10 ounces, and the urine is discharged at intervals of a quarter or half an hour up to two or three hours. Where severe cystitis is present the capacity is much diminished and the bladder holds only one or two ounces. When cystitis is mild or absent the capacity of the bladder is greater. Artificial distension of the bladder beyond its set capacity results in the fluid being discharged alongside the catheter, and the proceeding usually causes pain. Operation on the bladder in cases of severe cystitis in this stage showed the muscular wall thick, and the organ appeared to be in a permanent state of partial contraction. Cystoscopy in a number of cases in this stage showed chronic cystitis, but there was no trabeculation such as is found in the bladder in tabes.

Bladder Sensation.

The two varieties of sensation connected with the function of normal micturition are the sensation of distension and the urethral sensation which is felt in the prostatic urethra. In the cases of paraplegia under consideration the urethral sensation is more frequently and completely abolished than the tension sensation. The feeling of tension produced by an over-full bladder is preserved in greater or less degree in a fair number of cases. This may be felt for a time and then be abolished, or it may be the first sign of improvement taking place after being completely in abeyance for a prolonged period. The sensation is not so defined as in the normal individual unless recovery is far advanced. It amounts to a vague sensation of fullness somewhere in the abdomen, which in time the patient comes to connect with a distended bladder, the knowledge being checked by the patient feeling the distended bladder with the hand in the abdomen. Urethral sensation is abolished. The patient is unable to feel the urine passing or the catheter being introduced. In some cases, especially cases of cauda equina lesion and cases of partial cord lesion which are recovering, the passage of the catheter can be felt. The prostatic urethra, especially at the entrance into the bladder, is the sensitive part, the anterior urethra remaining anæsthetic.

Variation in the Bladder Condition in Lesions at Different Levels.

In the cases that have come under my observation there are examples of injury in all the regions of the cord.

In the cervical and dorsal region of the spine voluntary micturition was present in a few cases where the injury was slight. In all the other dorsal and cervical cases there was complete retention of urine when the injury was recent, and periodic reflex micturition when the date of the injury was more remote. The cases of periodic reflex micturition included those which I have described as in the transition stage—namely, periodic reflex micturition with incomplete emptying of the bladder, and also those where the final stage of periodic reflex micturition had been reached by the bladder having regained the power of completely emptying itself. All the above cases represent lesions situated above the lumbar centre for micturition.

It is of interest to examine those cases where the upper part of the lumbar spine was involved in the injury, for at this level lies the micturition centre. There were three cases of injury involving the eleventh and twelfth dorsal and first lumbar vertebræ; one affecting the first lumbar, one the second lumbar. In two of these cases the nerve symptoms pointed to a partial lesion of the cord. In one of these voluntary micturition was performed, and in one of them there was periodic reflex micturition. In three of the cases the symptoms pointed to a complete lesion, and in each of these was periodic reflex micturition. In none of the cases was there any resemblance to the condition which has been described as following destruction of the lumbar centre in experimental work on animals—namely, paralytic incontinence, the urine dribbling away from a flaccid empty bladder through a flaccid sphincter. In one of these cases the lesion was verified by operation by Lieutenant-Colonel Armour, the cord being found "badly pulped" at the level of the twelfth dorsal and first and second lumbar vertebræ.

Lesions of the cauda equina were present in 14 cases examined. The effect of the nerve injury on the act of micturition showed remarkable variation. Three cases of partial lesion of the cauda equina passed urine voluntarily and normally. Eight cases of partial lesion had periodic reflex micturition, following a stage of complete retention. Two cases of partial lesion of the cauda equina had complete retention. One of these was in the early stage, two months only having elapsed since the injury. A second, a unilateral lesion, had complete retention for 18 months. One case had a complete lesion with retention.

Complete retention after the injury, followed by periodic reflex micturition at a later date, was the rule in these cases, as in those where the injury involves the cord. A feature of the cauda equina cases was variation, from time to time, in the functional state of the bladder. In three of the cases there were recurrent attacks of retention of urine lasting from a week to a month after reflex micturition had become established.

Periodic reflex micturition or active incontinence is generally accepted as the condition which results when the micturition centre in the cord is cut off from the control of the brain, such as occurs in supralumbar lesions. For its development the reflex arc, together with the spinal centre, is supposed to be intact. It is not conceivable in this theory that injury to the afferent or efferent nerves of the bladder, within or without the spinal canal, could bring about this state of micturition. Yet periodic reflex micturition has developed in these 8 cases of cauda equina lesion.

These cases of injury to the lumbar enlargement of the cord and to the cauda equina support the view of Gaskell, already referred to, that the centre for micturition does not lie in the spinal cord but in the hypogastric and mesenteric plexuses. Possibly they may give to the ganglion cells in the bladder wall a more important rôle than has been hitherto ascribed to them.

The most striking points in considering the variation in the effect of injuries at different levels on the act of micturition may be summarised. Complete retention occurs, at the commencement, in all cases where micturition is affected, at whatever level the injury may be, and it occurs in cauda equina lesions as well as in cord lesions. Periodic reflex micturition is the second phase in all lesions of the cord, not excepting those of the lumbar enlargement. Periodic reflex micturition develops in more than half the cases of cauda equina lesion, but occasionally voluntary micturition follows directly on a period of complete retention.

Urinary Infection.

The most common and most fatal complication in a paralysed bladder is infection. Over 90 per cent. of cases of spinal injury arriving at the Star and Garter Hospital have a serious infection of the urinary tract, and all cases have at some period passed through a stage of severe infection. Of the total 111 patients 19 have died, all from urinary infection. At the King George Hospital 339 cases of spinal injury have been admitted, 22 were transferred and 160 have died, practically all from urinary infection.

It is important to inquire how the infection occurs and what is its nature. In all cases the infection takes place at an early period after the injury, usually within the first week. The circumstances surrounding the first few days following the injury render these cases peculiarly liable to the invasion of bacteria. The patient lies exposed for some hours, and in many cases has been inaccessible for two or even more days. During this time the urine collects and the bladder is greatly distended. In this state the patient, still suffering from profound shock, arrives at the casualty clearing station, where a catheter is passed and the bladder is emptied. The rush of urgent and serious cases, the very great difficulties in pursuing a perfectly aseptic technique, the ready soil which an over-distended paralysed bladder presents to the invasion of bacteria, together render infection extremely probable. And should it not take place here there are ample opportunities during transport to a base hospital either in France or in England for the bladder to become infected.

The cystitis which results is of a particularly severe character, and in most cases it is of the hæmorrhagic type. Cystitis in itself is not, or only very rarely, a fatal disease, and should the infection remain confined to the bladder no serious harm would result. In a large proportion of cases, however, the infection ascends to the renal pelvis, causing pyelitis, and invades the renal substance, when septic pyelonephritis results.

Septic pyelonephritis is a peculiarly fatal disease, and is the cause of death in the great majority of fatal cases of gunshot wound of the spine that survive the initial shock. The onset of pyelonephritis is marked by a rigor followed by a sudden rise of temperature to 102° F. or higher. There is pain in the loins, more marked on one side, and the kidney is tender and may be enlarged. The abdomen is distended with flatus and is rigid on the side of the inflamed kidney. The second kidney is not tender or enlarged. The urine is slightly diminished in quantity, but is not suppressed. It retains the characters of the urine in alkaline cystitis which were present before the onset of the renal complication. Hæmaturia, which is sometimes severe and may be continuous, frequently appears with the onset of the fever. Herpes of the lips is often present. The temperature may remain high or may have a swinging type, with repeated rigors. After a week the symptoms may subside or they may persist, the temperature remaining high. The patient becomes more drowsy, vomiting and hiccough appear, muttering delirium supervenes, and the patient passes into coma and dies.

A more common type seen at a base hospital is chronic septic pyelonephritis, with recurring attacks of acute pyelonephritis. The patient has passed at the commencement of the kidney infection, through a severe attack similar to that described. The temperature settles down to normal and the symptoms have disappeared. At intervals of some weeks or months, but often of only a fortnight, there are attacks of acute pyelonephritis. The temperature rises suddenly to 102° or 103°. It remains up for five or seven days and then returns to normal again, and remains normal or subnormal until the next attack. (Fig. 3.)

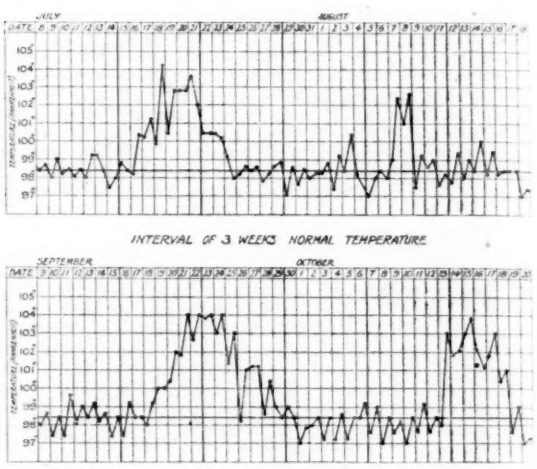
After a time the condition becomes one of chronic urinary septicæmia. The patient has a sallow, earthy complexion; the skin is dry and harsh, and seldom sweats. The lips are dry and the tongue becomes glazed, dry, and cracked. There is loss of appetite, a buccal dysphagia results from the dryness of the mouth, and only fluids are taken. The bowels are constipated. Progressive loss of flesh, apathy, and drowsiness become more and more marked. Polyuria amounting to 80 or 100 ounces in 24 hours, may be observed in the intervals between attacks, while the quantity of urine is diminished during an acute attack. The temperature is subnormal.

The course of chronic urinary septicæmia is interrupted by acute attacks of varying severity, frequently following some exciting cause, such as exposure to cold or too vigorous bladder washing. Finally the patient dies during an acute attack.

It is frequently a matter of difficulty to distinguish the septic state, due to absorption from a sloughing bedsore, from the symptoms of acute septic pyelonephritis. With a painful, enlarged, tender kidney, protected by rigid abdominal muscles, there is no difficulty in the diagnosis. But the pain may be slight or misplaced. It is not infrequently absent, or only elicited on careful questioning. In some cases of paraplegia the pain is felt not in the kidney area but in the epigastrium, and the position is misleading. Rigidity of the abdominal wall is a feature of a number of cases of paraplegia, quite apart from any renal infection. This may mask a tender kidney, or it may lead to an erroneous value being placed on the muscular rigidity. The enlargement of the kidney may be slight and difficult to detect. The urine forms no guide. It is an alkaline ammoniacal, occasionally blood-stained urine of alkaline cystitis.

In such difficult cases the points on which I place most reliance are tenderness of the kidney and the character of the temperature. Tenderness is almost always present in some degree, and a comparison of the two sides will help. The chief characteristic of the temperature chart is the occurrence of isolated attacks of high temperature lasting a week or ten days, with intervals of varying length, during which the temperature is normal, or, in advanced cases, subnormal. (Fig. 3.) The raised temperature due to absorption

FIG. 3.



Temperature chart of case of chronic pyelo-nephritis with acute exacerbations.

from a septic bedsore shows an irregular daily rise, continued over some weeks, with gradual improvement and without any definite periods of normal and subnormal temperature, or any well-defined short attacks.

In the late stages when both kidneys are infected the distinctive features are the red, glazed, dry tongue, headache, thirst, inability to take solid food, rapid emaciation, and dry, harsh skin. Vomiting is a late and serious symptom.

In investigating a case of paraplegia with fever it should not be forgotten that, owing to the anæsthesia, a large abscess may form in the neighbourhood of a bedsore or elsewhere and be quite painless, so that the patient does not draw attention to the spot.

TREATMENT.

Treatment of the urinary tract in paraplegia resolves itself into two chief lines: (1) Provision for the removal of urine; (2) treatment of septic complications.

The Removal of Urine.

Cases of paraplegia are divided into two classes in regard to the disposal of the urine. In the early stages there is complete retention and the urine must be removed artificially; in the later stage there is active incontinence, and the only necessity is to collect the urine as it is passed. In the stage of retention, some means of emptying the bladder must be used. Three methods are available. A catheter may be passed at regular intervals, a catheter may be tied in the urethra (catheter *à demeure*) or the bladder may be drained by operation.

1. *Catheter life.*—The passage of a catheter is the method that has been universally adopted. A catheter is passed at the earliest moment after the injury, and at regular intervals.

usually three times in 24 hours after this until active incontinence is established. Under favourable conditions the first catheterisation may be performed seven hours after the receipt of the injury. The average time that elapsed before a catheter was passed in 46 cases was 27 hours. Two patients lay out for four days, and four for three days before they could be reached. The average period during which the use of the catheter, for the purpose of emptying the bladder, is necessary is two months. In one case the duration of the retention stage was 18 months, in another 15 months, but these cases are exceptional.

2. *The tied-in catheter: catheter "à demeure."*—The tied-in catheter has been resorted to in a number of cases. In some for the purpose of draining an infected bladder, in others in order to avoid the necessity of catheterisation three or more times in 24 hours. The constant presence of the catheter in the urethra very quickly sets up urethritis, with purulent discharge and swelling of the urethral mucous membrane; and after a few days the method has to be abandoned in most cases. This method, useful for a short time in an emergency, is quite unsuitable for the continued treatment of retention in paraplegia. The danger which attends it is the development of a perineal abscess and the formation of a urinary fistula, or the sloughing of a large portion of the urethral wall, with the overlying skin. The tying-in of a metal catheter will bring this about in a few days, and is an extremely dangerous procedure, even in cases where no nerve lesion exists.

3. The third method is drainage of the bladder through a suprapubic wound. I shall discuss this method later.

Treatment of the Septic Complication.

1 *Local treatment by bladder washing.*—It is unnecessary to describe this in any detail, but one or two observations may be made. The best method is to use an irrigator, the reservoir holding 3 or 4 pints, and being raised about 3 feet above the level of the patient. By means of rubber tubing and a glass nozzle which fits the catheter, 3 ounces of fluid are run into the bladder and allowed to run out again into a vessel between the thighs, and this is repeated until the contents of the reservoir are exhausted. As large a catheter as will pass along the urethra should be used. No attempt should be made to distend the bladder beyond the amount of fluid it holds readily. If the pressure is raised too high by over-distending the bladder there is danger of forcing septic material up the ureter and causing an ascending infection or a recurrence of pyelonephritis when this has already been established.

Strong antiseptics should be avoided in washing the bladder. They cause swelling of the mucous membrane and an increase in the cystitis. The action in bladder lavage is as much a mechanical as a chemical one, and the total quantity of fluid used is of as much importance as the character of the antiseptic employed. Before commencing bladder washing the reaction of the urine should be tested, and a wash selected which will counteract extreme acidity or extreme alkalinity, if either state exist. In selecting a bladder-wash therefore, and also as I shall presently state, in choosing drugs for internal administration, the reaction of the urine should be the first guide.

Another point in regard to the reaction of the urine in bladder washing is that deposits in the bladder wall take place: mucous shreds and flakes in an acid cystitis, and phosphatic material and mucus in an alkaline cystitis. An attempt should be made at the beginning of each washing to remove these deposits by the use of a wash of different reaction. An acid wash will dissolve phosphatic débris, and an alkaline will facilitate the washing away of thick ropy mucus in an acid cystitis. A large number of different bladder washes have been tried, but no one is a specific, and the fluids commonly used are found to be as good as any.

In alkaline cystitis, and this forms the great majority of cases of cystitis, in paraplegia, boric acid solution one half the saturation strength may be used. If the urine be powerfully alkaline, and especially if fragments of phosphatic material are being formed and passed, a preliminary wash with a solution of acetic acid (B.P.), one drachm to the pint, should be used, and followed by boric solution, or large quantities of the acetic acid solution may be used for several days at a time. At the same time steps should be taken to render the urine acid by means of drugs given by the mouth.

In an acid cystitis normal saline solution, in full or in half-strength, is frequently very successful. Permanganate of potash solution (1 in 8000), peroxide of hydrogen solution (1 in 20 of 10 volumes), and silver nitrate solution (1 in 10,000) are all useful. A note may be made in regard to the newly introduced chlorine preparations. The solutions are intensely irritating to the bladder, and should be used with caution. A solution of 1 in 20,000 is sufficiently strong to use at first, and this may cautiously be increased in strength.

2. *Medicinal treatment.*—In giving medicines the two objects kept in view are the reduction of extreme acidity or extreme alkalinity of the urine, thus reducing the irritation of the bladder and, secondly, the administration of urinary antiseptics.

An acid urine is easily reduced to alkalinity by giving drugs such as bicarbonate of soda, potassium citrate and acetate, and diuretic waters such as those of Contrexéville, Vittel, and Vichy. An alkaline urine is usually difficult to render acid. The two drugs that have a powerful acidifying action on the urine are sodium acid phosphate (introduced for this purpose by Dr. Robert Hutchison), and sodium or ammonium benzoate. Sodium acid phosphate should be given alone and the dose increased every few days till the urine gives an acid reaction. The limit of tolerance is reached by diarrhœa being produced. Four or eight drachms in 24 hours are usual doses. The benzoates should be given in doses of 10 to 20 grains three times daily.

It is impossible here to enter into the details of treatment by urinary antiseptics. This has been discussed fully elsewhere.* It is sufficient to repeat that hexamine (urotropine) depends for its antiseptic action on splitting and giving off formaldehyde, and that this takes place only in an acid medium. Boric acid is the best urinary antiseptic when the urine is alkaline. It may be combined with ammonium benzoate, and when the urine has become acid hexamine may be added. When the urine is acid hexamine may be given alone.

In the early stage of an acute cystitis, the first object should be to soothe the intensely inflamed mucous membrane by drugs and diuretic waters, occasionally with the administration of sandal-wood oil.

3. *Vaccine treatment.*—Vaccine treatment has proved of great value in treating the chronic cystitis of these paraplegic cases. Vaccine therapy forms a chapter in itself, and there is not time to do more than to recommend its use.

DRAINAGE OF THE BLADDER BY SUPRAPUBIC CYSTOTOMY.

Lastly, I come to the subject of cystotomy, which I have deferred in order that I may link up the question of drainage in the different stages. In the first place, I wish to discuss suprapubic cystotomy as a prophylactic measure.

It should not too readily be accepted that infection of the bladder, with resultant ascending pyelonephritis, is inevitable. The infection is not a hæmatogenous infection from the bowel or elsewhere; it is an ascending infection introduced by the catheter. I have already referred to the circumstances in which catheterisation of these cases is commenced and to the very great difficulties of a perfect technique under such conditions. But the real danger, the fatal complication, is not the cystitis itself; it is the ascending pyelonephritis (surgical kidney) that results from it.

Cause of the Ascending Infection.

It is worth while inquiring how this ascending infection comes about. There are natural barriers to the ascent of infection. The lower end of the ureter penetrates the wall of the bladder very obliquely, and its longitudinal layer of muscle passes into the trigone. When the bladder is distended the trigone is pushed down and the bladder wall stretched, so that the intramural portion of the ureter becomes more oblique and flattened, and the intravesical tension further closes the lumen by pressure. When the bladder is contracted the intramural portion becomes shortened and less oblique, but the mucous membrane is thrown into folds which prevent a reflux of fluid. The downward flow of urine is a further protection against the ascent of bacteria. When the bladder is forcibly over-distended by injecting fluid through a catheter these barriers are overcome, and fluid may be forced up the ureter.

In the early retention stage of these paraplegic cases the bladder is greatly over-distended, sometimes for several

days; and there is no doubt that the barriers to a reflux into the ureter must be considerably weakened if not entirely overcome. Further, the effect of the over-distension and consequent great increase in tension have caused damage to the kidney. Guyon and Albarran[9] made experiments in 1897 on the effect of acute retention of urine on the kidneys. They found that an aseptic pyelonephritis resulted. There was acute congestion which might go on to intratubular hæmorrhages, with desquamation of epithelium of the tubules. Clinically, there was lessened secretion of urine, while the urine contained a reduced quantity of salts, and there were present blood, renal cells, blood casts, and epithelial casts. Relief of the retention was followed by polyuria and the symptoms subsided if no sepsis were present.

In these paraplegic cases we have the barriers against ascending infection overcome and the kidney damaged, and therefore unusually susceptible to the invasion of bacteria. The smallest slip in technique will surely lead to cystitis and ascending pyelonephritis, and such a slip must be guarded against, not only at the first catheterisation, but during the whole retention stage of many weeks, or even months. Over-zealous washing of an inflamed bladder with too strong antiseptics or too great distension of the bladder will just as readily produce an ascending infection as a septic catheterisation of the original over-distended bladder. The ascent of infection from the bladder to the kidneys is, in my view, due to pressure or intravesical tension. There are other factors that may play some part. The motile bacillus travels upwards, even against stream. The fact that there is a nerve lesion may reduce the resistance to bacterial invasion. Probably the ureteric orifice is more easily forced in such cases. But these are all of secondary importance, and the raised intravesical tension caused by chronic retention is the deciding factor.

Prophylactic Cystotomy.

Is there a remedy? Certainly there is, and it lies in early and continuous drainage of the bladder. Continuous urethral drainage by catheter is unsuitable, as I have already pointed out. The only method that is efficient is suprapubic cystotomy. Let me make the position quite clear. Suprapubic cystotomy here advocated is not suprapubic cystotomy for the drainage of an already infected bladder. I see a fair number of these cases and will discuss them later. The suprapubic cystotomy suggested is to take the place of the catheter entirely. No catheter is passed at any time. One catheterisation may be sufficient to cause the whole damage—cystitis and ascending pyelonephritis. It is suggested that the bladder be opened suprapubically at the earliest possible moment, before any catheter has been introduced, and be drained continuously until the second stage of active incontinence is reached; as shown by the patient passing urine along the urethra, as well as draining by the suprapubic tube. I have seen no cases in which this has been done, and have not heard of its having been carried out.

Will this prevent cystitis? It may in some cases, but I do not expect it will in all; but I hope that the cystitis when it occurs will be of a milder type. Cystitis in an open bladder is a very different affair from cystitis in a closed, paralysed bladder. There are very few cases of cystitis in an open bladder that cannot be cleared up by the use of continuous irrigation. The important point is that there is no urinary tension inside a drained bladder, and therefore no tendency to ascending infection; and this is the object of the drainage.

If 20 cases were treated thus and followed up carefully the result could easily be ascertained. I do not doubt that the results would be much better than those in 20 consecutive cases treated by catheter or by bladder drainage after the bladder had been infected by the catheter. Are all cases to be placed in the same category? I have already stated that the same initial stage of retention may result from a lesion of any part of the cord or the cauda equina and, later, be followed by active incontinence or voluntary micturition. All cases are thus equally in danger. It is not the extent of the nerve lesion that matters: it is the paralysis and over-distension of the bladder.

Is it practicable? This is a question that cannot be fully answered by a surgeon working at a base hospital. The great majority of cases are catheterised for the first time at a casualty clearing station. What the facilities are at this station for the performance of a rapid suprapubic cystotomy only those on the spot can say. A more practical point for me to discuss is: What time may be allowed to elapse before draining the bladder in these cases, so that the patient may be conveyed to some place where suprapubic cystotomy can be safely performed without being subjected to undue risk by delay in emptying the bladder?

It is obvious that the sooner the drainage is done the better, but I do not think great harm would result if the bladder could be drained in 24 or even 48 hours after the receipt of the injury so long as no catheter was passed before that. Morphia might, in the absence of other contra-indication, be given if necessary. The operation is not a difficult or a long one. The anæsthesia in most cases extends above the suprapubic area, so that no general anæsthetic is necessary. The bladder is fully distended with urine, so that no catheter need be passed.

A vertical incision 1½ inches long is made from the upper border of the symphysis pubis in the middle line, the rectus sheath and pyramidalis muscles cut through, the fibres of the recti separated, and the forefinger seeks the upper margin of the symphysis pubis, detaches the thin transversalis fascia from this, and sweeps the peritoneum upwards. The firm cushion of the bladder wall can then be felt. A scalpel is passed along the finger and plunged through, and the finger slips into the bladder cavity as the urine rushes out.

A self-retaining Pezzer rubber catheter on a stilette is pushed along the finger, guided into the bladder, and the finger removed. A small wick of gauze is placed in the prevesical space, and one, or at most two, silkworm-gut stitches bring the rectus sheath and skin together above the tube. A broad layer of gauze is thoroughly covered with boric acid crystals (not powder) and another layer of gauze over this, so that the crystals are sandwiched in the gauze, and this applied round the catheter, and held in place by two strips of adhesive plaster. The end of the catheter is carried into a bottle between the thighs, or at the side of the loin, an additional piece of rubber tubing being added to the catheter, if necessary. This arrangement will suffice to drain the bladder until a base hospital is reached and some more elaborate system can be devised.

Suprapubic Cystotomy for Cystitis.

Suprapubic cystotomy has been frequently performed with the object of draining a septic paralysed bladder, or when the urethra is œdematous and bleeding from catherisation. At the time this is done the urine is infected, and is often alkaline and stinking. Two tubes kept together by a silkworm gut stitch should be introduced into the bladder, and the edge of the bladder wall may be stitched with catgut to the rectus sheath or to the skin. The double tube is used for continuous irrigation, the irrigating fluid passing down one tube and out of the other. For the first four or five days after the cystotomy, and intermittently after that, continuous irrigation should be carried out with weak antiseptic solutions such as silver nitrate (1 in 10,000), permanganate of potash (1 in 5000), peroxide of hydrogen (1 in 40 of 10 vols.), &c. It is carried out in the following manner:—

A Hamilton-Irving suprapubic drainage-box is adjusted, and one of the outlet tubes is carried under one thigh and over the edge of the bed into a large receptacle. The other outlet tube may be clipped. A reservoir is hung two or three feet above the level of the patient, and from this a rubber tube passes, being interrupted just below the reservoir by a dropping-glass. The rubber tube passes through an opening in the lid of the Hamilton-Irving box and into one tube in the suprapubic wound. The other suprapubic tube acts as an outflow tube.

Continuous irrigation may be carried out day and night for four or five days, or it may be interrupted for a few hours at a time. This treatment very quickly clears up cystitis if no source of recurrent infection, such as pyelonephritis, is present. Unfortunately, in the great majority of cases in which suprapubic drainage is performed ascending infection has already taken place, and the bladder is constantly reinfected from this source. A very important question arises, however, in regard to suprapubic drainage at this stage. Is it possible, by draining the bladder, to influence the progress of pyelonephritis already established? In the advanced stage, when the symptoms of urinary septicæmia are well marked, I do not believe that any benefit will follow the operation. The progressive emaciation will continue, the anorexia and vomiting increase, and the patient die in spite of free bladder drainage. In the earlier stages, however, when the patient has passed the initial

attack, when the cystitis is well marked and he gets recurrent attacks of pyelonephritis, drainage of the bladder, by obviating the necessity of bladder washing and by abolishing intravesical tension, should prevent the recurrence of the ascending infection.

In some cases the Hamilton-Irving apparatus cannot be used, on account of the extreme flexion of the legs, and the spasmodic contraction of the abdominal and thigh muscles, set up by pressure on the abdomen.

During the first week or so, there is leakage alongside the tube in the suprapubic wound. The use of a suction apparatus such as that of Cathcart is of great value in keeping the patient dry in these cases. After this the wound contracts down on the tube, and a rubber plaque with a rubber cannula to carry the tube is strapped on over a small square of boric lint. This is retained in position by a rubber or canvas waist-band. In many cases it is sufficient to keep a No. 12 rubber catheter in the suprapubic wound and connect it by rubber tubing passing over the abdomen into a bottle lying at the side, in the hollow of the loin. A piece of adhesive plaster will keep the tube from slipping, and no leakage occurs alongside.

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A METHOD OF CONCENTRATING ENTAMŒBA CYSTS IN STOOLS.*

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Introductory.

THE following investigations have been carried out on behalf of the Medical Research Committee and with the assistance of the Durning-Lawrence Fund, under the directorship of Lieutenant-Colonel Sir Ronald Ross.

One of the principal objects of our experiments has been the cultivation of the causative organism of amœbic dysentery, and, as is well known, the difficulties in the way of the accomplishment of this have hitherto proved insuperable, almost all observers now being agreed that the amœbæ which have been successfully grown are distinct from both *E. coli* and *E. histolytica*; in fact, the genus created by Chatton and Lalung-Bonnaire,[1] *Vahlkampfia*, has been frequently used, especially for the culturable intestinal forms, to emphasise their distinction from these two species. In a recent communication Penfold, Woodcock, and Drew[2] have described a method by which they have succeeded in causing the excystation of *Entamœba histolytica*, but they also state that they have been unable to keep the excysted amœbæ alive for more than a comparatively short time, 42 to 44 hours as a maximum. This failure to obtain a successful culture they ascribe to the rapid growth of bacteria in their preparations, derived from the fæcal matter not got rid of in the washings to which the cysts were subjected. The injurious influence of the products of putrefactive bacteria has, indeed, been already shown experimentally[3] with cultures of amœbæ of the *limax* type. We have therefore since then devoted a considerable amount of time to the attempt to devise a method of completely separating the cysts from the fæcal matter contained in the stools.

Such a separation as we have just mentioned has not, so far as we are aware, been accomplished by anyone in the case of amœba cysts, but a modification of Bass's method of concentration described by Cochran[4] has very nearly achieved it for helminth ova. This method consists in the preliminary emulsification of the fæces in water, and then centrifugalisation, after which the supernatant water is poured off, and the centrifuge tubes filled up with a 42·5 per cent. solution of calcium chloride in water, well shaken and re-centrifuged, when the eggs rise to the top of the tubes, away from the fæces and almost free from contamination.

On trying this method with *Entamœba coli* cysts, we found that the cysts are far too fragile to withstand the osmotic currents set up by the concentrated solution, and incontinently crumple up; and a number of other chemical substances, such as syrup, glycerine, and albumin, which we have tried, have given precisely the same results, so that we feel that there is probably no specific gravity method of differentiation between cysts and fæces which will avail for entamœbæ, nor has any other method that we have yet found enabled us to achieve the complete separation of cysts and débris. We have, however, obtained a very considerable measure of success by the methods detailed below, and we are now able to obtain the cysts practically free from bacteria, and from the major part of the fæces.

The principal part of the experiments which we have carried out in investigating this method has been done with fæces infected with *E. coli* cysts, of which a constant supply has been available to us, but a sufficient series of determinations has been made with *histolytica*-infected material and with *Lamblia* infections, to show that it is equally applicable to these species, and we see no reason to suppose that any protozoal cysts would not be equally easily concentrated by it.

The technique of the method used to obtain a maximum concentration of the cysts is given first; subsequently we describe a method by which we have obtained a relative concentration without the use of any chemicals (which might possibly injure the cysts for cultivation purposes); and, finally, we describe a counting method which was devised to confirm the results of our concentration experiments.

I.—*The Maximum Concentration of the Cysts for Diagnosis.*

A lump of fæces, which should be at least 1 gramme in weight, is shaken up with about 30 c.c. of normal saline (0·8 per cent. solution of NaCl) per gramme of fæces for a sufficient time to disintegrate the mass into individual particles, and thereby form an emulsion which will only settle very slowly. This is best done on a mechanical shaker in a large flask or bottle of a capacity of at least four times the amount of fluid to be shaken, and we have found it necessary, in order to obtain the best results, to continue the shaking for a minimum of half an hour.

The emulsion is then poured into a separating funnel and shaken up, by hand, for half a minute with 10 to 20 per cent. of its volume of ether (ordinary methylated ether is perfectly suitable for this), after which the mixture is allowed to stand for a minute or two in the funnel until the two liquids have separated. The fæcal débris absorbs ether and consequently becomes lighter than water, and, when separation is complete, lies in a mass at the top of the saline, immediately below the excess of ether. The cysts are not affected by the ether, and consequently remain in the saline beneath.

The saline fluid is then drawn off from the separating funnel, and is centrifuged at a slow speed for two or three minutes, the precise time required necessarily depending upon the rate of centrifugalisation and the size of the tubes. By this means the cysts will be brought down to the bottom of the tubes with the comparatively slight amount of fæcal matter not taken up by the ether.

For ordinary diagnostic purposes the concentration now effected, which should be some 15 times as rich in cysts as the original material, will be found adequate, but, if desired, a still greater proportion of cysts can be obtained by decanting the supernatant liquid and filling up the centrifuge tubes with normal saline, shaking thoroughly, and submitting the tubes to fractional centrifugalisation, the material brought down in the first 10 seconds being discarded,

* Read before the Section of Pathology of the Royal Society of Medicine, Nov. 14th, 1916.

[1] Amibe limax (Vahlkampfia, n. gen.) dans l'intestin humain. Son importance pour l'interprétation des amibes de culture. Bull. Soc. Path. Exot., Paris. Vol. v., 1912.

[2] The Excystation of Entamœba Histolytica (Tetragena) as an Indication of the Vitality of the Cysts, Brit. Med. Jour., May 20th, 1916.

[3] Cropper, J. W., and Drew, A. H.: Researches into Induced Cell-reproduction in Amœbæ, McFadden Researches, vol. iv., April, 1914, John Murray, London.

[4] The Concentration of Helminth Ova from Fæces, China Medical Journal, vol. xxix., 1915.

and the whole time of centrifuging curtailed by half. By repeating this process two or three times the maximum concentration is obtained, and the débris still remaining consists almost entirely of particles of practically the same size as the cysts themselves.

The above is a concise account of the method and its results. We append a series of notes on the various processes.

It is desirable, where possible, to take a fairly large mass of fæces for concentrating, since there appears to be considerable variation in the number of cysts present in different parts of the same stool, and one of the special advantages of a concentration method is to minimise the risk of missing cysts not equally distributed.

The period given for mechanical shaking may seem extraordinarily long, but our experience is that unless the various particles of fæcal matter are thoroughly washed off from the cysts the latter are removed with their adhering particles by the ether, and consequently do not appear in the final deposit. In fact, test experiments differing only in the length of time the fæces were shaken with saline showed at least twice as great a proportion of cysts in the final deposit after 30 minutes' shaking as after 15 minutes; and while in the latter case examination of the material removed by the ether showed a considerable proportion of cysts, they were almost entirely absent from it in the material shaken for 30 minutes. This length of time may, however, need to be modified in accordance with the character of the stool to be examined; our own investigations have been principally made on formed or sub-formed stools.

We have employed tap water, distilled water, and normal saline for emulsifying the fæces, and we think that saline is preferable. Whatever the method used, we have very frequently found that a considerable number of cysts have shown what we regard as osmotic collapse, their protoplasmic contents being withdrawn from the cyst wall and collected into a spherical mass about half the diameter of the cyst, but we are unable at present to determine the precise causes which have produced this result, as both the occurrence of the phenomenon is irregular and the proportion of cysts affected has varied very considerably under the same conditions. We find, however, that there tends to be a smaller proportion of cysts showing this effect in emulsions for which normal saline has been used than in tap water or distilled water emulsions from the same fæces and prepared concurrently under identical conditions. The ether employed subsequent to emulsification may be to some extent responsible, but we have more than once observed collapsed cysts in material which has not been treated with ether. In our experience this collapse does not interfere with the identification of the cysts, and we have never seen it save in *E. coli*.

We find that the proportion of the material removed by the ether varies considerably with the character of the stool used, but with an ordinary formed stool at least 90 per cent. of the weight of fæces employed is extracted. To give a concrete example, 10 grammes of fæces were emulsified, treated with ether, and centrifuged in tubes of known weight, and the deposit, after pipetting off the supernatant fluid, weighed 0·595 gramme.

Should the fæces contain fruit pips or other large heavy particles not removed by the ether it is advantageous to transfer the fluid, after treatment with ether but before centrifuging, to a tall test-tube or similar vessel and to permit the heavy particles to settle for a minute before decanting into the centrifuge tubes. The cysts themselves settle very slowly, and it has been found that the proportion which fall to the bottom with the large particles in one minute is negligible.

The time which we have found most suitable for centrifuging with 15 c.c. tubes is either 1½ minutes at 1200 revolutions per minute or 2½ minutes at 600 revolutions per minute. This will bring down practically all the entamœba cysts from the fluid, but only a small proportion of the bacteria present come down in this length of time. In the case of lamblia a more thorough centrifuging is needed to bring down all the cysts.

The special advantages which this method possesses for diagnosis are obvious. The cysts are much more easily noticed and far more easily identified in the concentrated material than in preparations from untreated fæces. The saving of time spent in the examination of scanty or doubtful infections is considerable, and the concentrate from a comparatively large mass of stool can be examined in a short time: there is, further, the added advantage that the possible errors attendant upon the examination of a single loopful of fæces are almost wholly eliminated. This is especially useful in the case of suspected infections in which the ordinary preliminary examination has given a negative result, and we think the method will also prove to be of great value for the final examination of carrier and of apparently cured cases before discharge.

An illustration is given (Fig. 1) of the appearance under the low power of a field from a concentration prepared in this manner. A count of the original fæces, from a smear made in the ordinary way without concentration, gave 48 cysts in 117 fields under the same lens; after concentration there was hardly a field to be found in which there were not a dozen cysts, and the average number per field was between 16 and 17.

II.—*The Relative Concentration of Cysts for Cultivation.*

We feel that there are distinct disadvantages in the use of ether for treating material to be employed for cultural purposes, as the prolonged contact of the cysts with ether and with ether-saturated water may easily have some deleterious effect, and we have consequently devised a method of concentration which does not require chemicals. The first attempt to effect this was made by filtering an emulsion of fæces in water or normal saline through very fine silk cloth, some varieties of which show microscopically a mesh which is but little larger than an entamœba cyst. It was hoped in this way to remove all particles larger than the cysts, but in practice the meshes became clogged so rapidly with débris that no filtrate was obtainable, even with the aid of a pressure pump. The smallest mesh which can be employed satisfactorily for the filtration of fæcal emulsions is about 40μ in diameter, and the method by itself is of little value for concentration purposes. Combined, however, with subsequent centrifugalisation it forms a ready means of obtaining a large proportion of the cysts free from all particles save those which approximate in size to that of the cysts, the larger fragments being held back in the deposit of the silk and the minuter débris remaining suspended in the tubes after centrifuging.

It was found, however, that no modification of this method would give so large a proportion of cysts to débris as the ether method described above, and estimations of the number of cysts per gramme of stool, as determined from the deposit in the tubes by our method of counting, showed that they were considerably less than the actual number present in the untreated fæces, a considerable number having been lost during the treatment, so that the concentration was only a "relative" one—i.e., with respect to the nature of the accompanying débris.

As finally adopted, our method follows in most respects that used by Penfold, Woodcock, and Drew, but as it differs in certain points of importance we think it desirable to give it in full, especially in order to emphasise the necessity of these or similar measures when undertaking any routine work in an endeavour to cultivate entamœbæ.

Ten grammes of fæces are shaken with 100 c.c. of normal saline in a bottle or flask on a mechanical shaker for 5 minutes to obtain a uniform emulsion. This is poured on to a layer of fine silk whose mesh is of the size mentioned above, and which is stretched on a tambour (such as is used by milliners), and the emulsion is gently and continuously stirred with a glass rod to prevent the clogging of the meshes of the silk. The residue left on the filter consists chiefly of large lumps and stringy matter, and is discarded. It contains only a small percentage of cysts, which can be still further reduced, if required, by washing. The filtrate (or a portion of it) is then centrifuged for one minute at a speed of 1200 revolutions per minute, the supernatant liquid poured off, and the volume made up again with normal saline. The tube is then well shaken, and again centrifuged as before. This process is repeated until the supernatant liquid is almost clear. Finally the deposit is shaken with 10 c.c. of normal saline and is allowed to stand for a few minutes. The upper portion is then poured off and is thoroughly centrifuged, and loopfuls of the deposit are used to make hanging-drop preparations for culture experiments. An illustration (Fig. 2) is given of a high-power view of the appearance of cysts and débris in such a preparation.

By this means cysts are obtained which have been thoroughly washed free from toxic bacterial products, acid substances, and other deleterious matter present in the original fæces. The cysts can be found easily with low

powers of the microscope, and are not subsequently lost, even though it is necessary to keep the preparations for several days in the incubator. *Amœba limax* cysts submitted to this process have been subsequently cultivated without difficulty, and were evidently unaffected either by the shaking or the centrifugalisation.

It must be noted that the length of time, and the speed, of centrifuging considerably affect the percentage of cysts in the final deposit; and we have selected one minute at 1200 revolutions per minute as giving the best practical results. Apparently about two minutes is required to carry down all the cysts, but a much greater proportion of the finer particles of fæcal matter and bacteria accompanies them than when centrifugalisation is confined to the shorter time. An additional method of removing any large particles that may still be present is afforded by centrifuging for 15 seconds at 600 revolutions per minute, decanting the fluid into other centrifuge tubes and re-centrifuging for one minute at 1200 revolutions per minute; the larger particles are brought down during the preliminary 15 seconds with but a very small proportion of the cysts, and this process, repeated four times, results in the larger débris containing only one-tenth of the proportion of cysts present in the original fæces.

We have not been able to separate the cysts from débris to any further extent except by picking off a single cyst in a capillary tube, which is a comparatively simple matter in the case of *E. coli*, and has been done repeatedly in our experiments.

III.—*Method for Counting Entamœba Cysts in Stools.*

In THE LANCET of June 10th, 1916 Miss Annie Porter[5] described a method of counting lamblia cysts in stools by means of a Thoma-Zeiss hæmocytometer. Finding the volume of the chamber too small for counting entamœba cysts, owing to their comparative scarcity—viz., about 1 cyst per 400 squares in an ordinary degree of infection—we devised the following method, which is described in the stages in which it is carried out.

A uniform emulsion of 10 grammes of stool (selected from several different portions of the bulk) is made in 100 c.c. of normal saline (i.e., 10 per cent. weight ÷ volume) by shaking on a mechanical shaker for 10 minutes. All soft masses are broken up in this way, and the sediment which falls consists only of gritty particles, the so-called "false sand," which microscopic examination shows to contain no cysts.

A capillary pipette is made and is calibrated to deliver 20 c.mm. in a length of about 2 inches. It is provided with a rubber teat. It is well to have several of these pipettes ready to hand, so that successive counts can be made with a dry one without any unnecessary delay. The pipette supplied with Gowers's hæmacytometer, and other similar ones which are on the market, can be used for the purpose, but they have a somewhat narrow bore and frequently become clogged with débris. There is little risk of any cysts being retained in a pipette made according to the above instructions when the mixture is blown out: in fact, we have not yet found a single cyst in the washings out after use.

Several glass slides, 3 inches by 1½ inches, having been prepared with a ring of vaseline 1 inch in diameter, a measured volume (20 c.mm.) of the emulsion of fæces is drawn into the pipette and is placed in the centre of the ring.

A cover-slip ruled in squares, such as is used with Böttcher's slides, is then allowed to fall gently, with the engraved face lowermost, flat on to the drop of emulsion, and, if necessary, is pressed down to diminish the depth of the layer of liquid. The count is made with a low power. The cysts which happen to be in any portion of the drop which extends beyond the squares are easily counted, and are indicated in the count by the letters A, B, C, &c. The squares themselves are numbered as shown (the reverse way up) in the diagram (Fig. 3).

FIG. 3.

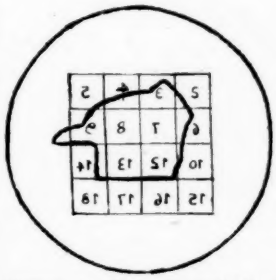
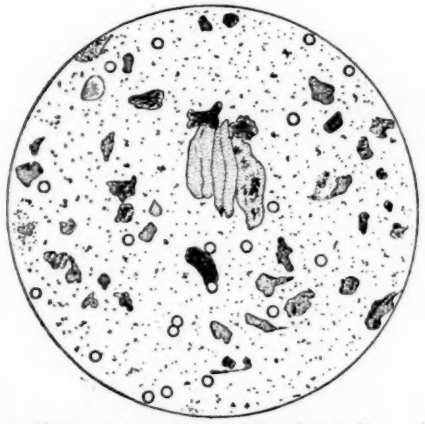


Diagram to show the method of counting entamœba cysts in stools. The edges of the large drop of 20 c.mm. of fæcal emulsion are indicated by the thick irregular line, and all cysts in this drop are counted with a low power. × 1½.

We have made sufficient experiments to establish the utility of the method for counting entamœba cysts in fæces, and we see no reason why its employment should not be extended, with such modifications as are found necessary, to the counting of other protozoa, either in their natural surroundings or under different conditions of cultural environment.

It has been pointed out to us by Sir Ronald Ross that in counting methods there are considerable statistical errors, the magnitude of which depends, roughly in an inverse ratio, on the actual number of things counted. Thus it is necessary to count a fairly large number of cysts in order to reduce the error to a reasonable percentage, and the present method has been devised to render this possible. The statistical tables compiled by Ross and Stott[6] show, for example, that if only 68 cysts are counted the probability is 9 to 1 that the error does not exceed 20 per cent., and that, if the error is required to be within 10 per cent., 271 cysts must be counted. It is advisable, therefore, to use an emulsion for counting purposes as thick as possible, consistent with ability to recognise the cysts without difficulty. For counting *E. coli* cysts we find a 1 in 10 emulsion the most suitable, and in an average infection we count 100 cysts. With *Entamœba coli*, as in Miss Porter's cases of *Lamblia* infection, there are considerable daily variations in the number of cysts present in the stools, ranging in a case we have been studying from 1500 to 60,000 per gramme.

FIG. 1.



Maximum concentration of *E. coli* cysts in stools by the ether method. One field. Low power: × 50.

FIG. 2.

All visible particles and a 4-nucleate cyst of *E. coli* in one field of an emulsion prepared by the method of relative concentration for cultivation experiments. High power: × 275.

Summary.

1. Methods of concentrating entamœba cysts from fæces are described, suitable for diagnosis and cultivation experiments respectively. 2. A very high concentration, suitable for diagnosis, has been obtained by emulsifying fæces and treating the emulsion with 10 to 20 per cent. of ether. This removes the greater proportion of the fæcal matter, while the cysts remain in the saline used for emulsification, and are collected by subsequent

[5] An Enumerative Study of the Cysts of *Giardia* (*Lamblia*) *intestinalis* in Human Dysenteric Fæces.

[6] Tables of Statistical Error, Annals of Tropical Medicine and Parasitology, vol. v., No. 3, December, 1911.

centrifugalisation with but little accompanying débris. 3. A second concentration method is described which does not necessitate the use of ether, and which is therefore more suitable for preparing cysts for cultivation experiments. This consists of filtering the emulsion through silk, and subsequent fractional centrifugalisation. 4. The difficulties in the way of enumerating entamœba cysts are discussed, and the method found most suitable, by means of the cover-slips used with Böttcher's slides, is described.

A CASE OF SUPPURATIVE MENINGITIS WITH GLYCOSURIA SIMULATING DIABETIC COMA.

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AND

W. H. McKINSTRY, M.B., C.M. GLASG., D.P.H. LOND.,

TEMPORARY CAPTAIN, R.A.M.C.

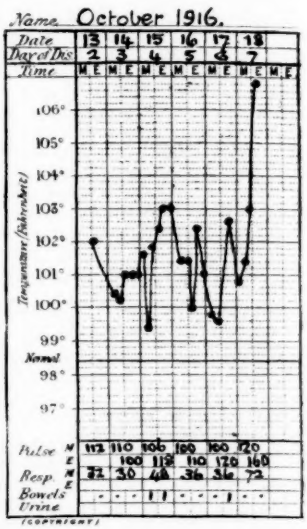
ON Oct. 13th, 1916, the following case was admitted into the Queen Alexandra Military Hospital, and was thought worthy of being placed on record on account of several interesting points to be discussed later.

Second Air Mechanic A——, of the R.F.C., aged 36, with four months' service, had been ill for 24 hours, complaining of severe pain in the right side of the chest, cough, and difficulty of breathing. On admission the patient appeared ill, with flushed face and marked dyspnœa. The temperature was 102° F., the pulse-rate was 112, and the respirations were 38 per minute. Examination of the chest revealed diminished expansion of the right lower chest, with stony dullness and absence of tactile vocal fremitus and breath sounds of the right lower lobe. Typical "rusty" sputum was being expectorated, and the case was diagnosed as one of pleurisy and pneumonia. Poultices were applied to the chest. Calomel gr. iii. and pulv. ipecac. co. gr. x. were ordered *statim*.

Oct. 15th: The patient had had a bad night. Pain was intense, so that he could not lie comfortably in bed. The temperature still ranged from 101° to 103°. The pulse was of good quality, with a rate of 100. The respirations were very rapid, rising to 60 per minute. The physical signs in the chest remained the same, no signs of fluid being present. There was no cyanosis. The heart and pericardium were normal. The application of leeches to the right side of the chest caused great relief of the pain almost immediately, and a stimulant expectorant mixture was prescribed. Oct. 16th: Patient appeared to be greatly improved, said he felt quite well, and was very cheerful. The temperature was 102°, pulse 100, and respirations 36. There was very little cough and no expectoration.

Oct. 17th: The ward sister noticed some twitching of the patient's face; he had previously complained of intense headache. He vomited immediately afterwards and became very collapsed with incontinence of fæces. Coma rapidly supervened, with dilated pupils which did not react to light. Conjugate deviation of the eyes was noted first to the left and then to the right. All the superficial reflexes except the conjunctival were lost. Later he became very restless, constantly picking at his face, which wore a perpetual frown. The respirations rose to 64 and presented the appearance of air-hunger. The pulse still remained of good quality, being 100 to the minute. He had retention of urine, and a catheter was passed, drawing off 20 oz. On examination this contained a trace of albumin and a few hyaline and granular casts, as well as a large amount of sugar (not estimated quantitatively), but acetone and diacetic acid could not be detected. No distinctive odour of his breath could be recognised by any of several observers who examined him with this in view. Further, no history suggestive of glycosuria—excessive thirst, wasting, or polyuria—could be elicited on cross-examination of his wife; his health before this attack seemed to have been very good. An attempt made to administer alkalies subcutaneously was unsuccessful on account of the patient's restlessness, and rectal salines met with no better results. He could not take anything by the mouth. His condition remained much the same during the night.

Oct. 18th: The respirations were now 80 and the pulse 144, and inclined to be irregular. His colour had much improved. The pupils were no longer dilated. He appeared to be temporarily paralysed on the left side, and had conjugate deviation of the eyes to the left. Incontinence of urine now developed, but a sample of urine was collected and found to be quite free from sugar, whilst the quantity of urea present was normal. Venesection was performed, 20 oz. of blood being removed, and two pints of normal saline containing 1 per cent. sodæ bicarb. were injected into the vein. Later the eyes became deviated to the right, the pulse got weaker, Cheyne-Stokes respiration developed, the colour became cyanosed, spasms of the jaw and muscles of both arms were noted, and the patient died at 3P.M. Just before death the temperature rose to 107°. The temperature chart is here shown.



Temperature chart showing rise of temperature to 107° before death.

A post-mortem examination was made 36 hours after death. The body was well nourished and showed no signs of external injury except a hæmatoma about the size of the palm of the hand between the umbilicus and left anterior superior spine of the ilium. Thorax: The whole of the pleura covering the right lung was covered with a layer of semi-membranous purulent exudation about a quarter of an inch thick, which could easily be peeled off. The left lung and pleura appeared healthy. There was no free fluid in the pleural cavity. The heart appeared normal and there was no pericardial effusion. The vessels about the base of the heart and the structures in the mediastinum were normal. Abdomen: All the organs, including the kidneys and liver and pancreas, appeared healthy. Brain: On removing the outer coverings of the brain pus was found mapping out the sulci on the anterior, superior, posterior, lateral, and internal surfaces, and also following the course of the blood-vessels. When the brain was removed the base was found free from pus except for a small area on each side where the middle meningeal artery takes its origin. The upper surface of the cerebellum was thickly covered with pus, particularly in the region adjoining the mid-cerebrum. The other surfaces of the cerebellum were free from pus. No pus could be found about the medulla. The brain when cut into showed no sign of abscess or excess of fluid in the ventricles.

Smears taken direct from the pus in the sulci, stained by Gram's method, showed long chains of streptococci as well as staphylococci. Streptococci were also found in smears from the cerebro-spinal fluid and in the blood drawn direct from the seared heart. Media of agar, broth, and trypsin legumin agar inoculated from the blood and the pus from the brain and pleura, incubated at 37° C. for 24 hours and examined, showed growths of streptococci, *Staphylococcus aureus*, and a large Gram-positive sporing organism, the last being, no doubt, due to post-mortem invasion of the tissues.

Although the nature of this case was plainly revealed by the post-mortem examination, the recognition of the cause of the sudden coma formed a difficult and perplexing problem during life. It was in the attempt to settle this question that the urine was sent for examination, and when it was found that it contained a large quantity of sugar the diagnosis of diabetic coma was raised. The absence of polyuria and of acetone and diacetic acid in the urine, as well as the absence of the characteristic sweetish acetone-like odour of the breath, rendered this diagnosis a very questionable one.

The question of uræmic coma was next raised, seeing that albumin, though in small amount, as well as a few hyaline and granular casts were found in the urine. The determination of the percentage of urea was then suggested, and for this purpose a further specimen of urine was obtained on the following day. The percentage of urea was found to be normal (i.e., 2 per cent.), and this fact was taken as disposing of the diagnosis of uræmic coma. A quantitative determination of the sugar was then decided upon, but in this specimen no trace of sugar or other Fehling reducing substance could be obtained, showing that the glycosuria was

only a transient condition. Lastly, the terminal hyperpyrexia, the temperature rising just before death to 107° F., which occurs not uncommonly in infective conditions, is an interesting point to note.

As regards the relationship between diabetic coma and the presence of the acetone-bodies in the urine, Cammidge[1] states that "all cases of diabetes are not complicated by acetonæmia, although it is a constantly present menace, since a deficiency in the oxidative process of the body is an essential element of the condition. It is only when this reaches a certain stage that the acetone bodies appear in the urine as a necessary consequence." Further, he states the acetone and aceto-acetic acid, though usually present in the urine when the coma supervenes, are not so abundant as before, but that the amount of beta-oxybutyric acid is generally much increased.

The completed history of the case, with its transient glycosuria, indicates the neurogenous origin of the glycosuria. Regarding this condition, Cammidge[2] states that "such a transitory glycosuria, apparently of central origin, has been noticed in connexion with lesions of both the central and peripheral nervous system, such as tumours and hæmorrhages at the base of the brain, lesions of the floor of the fourth ventricle, cerebral and spinal meningitis, concussion of the brain, fracture of the cervical vertebræ, tetanus, and sciatica. It has also been met with after epileptic, hystero-epileptic, and apoplectic seizures, in traumatic neuroses, such as those following railway accidents, mental shocks, mental strain, worry, fatigue, and great anxiety."

The practical lesson which this case enforces is the danger of concluding that the presence of sugar in the urine of a comatose individual is necessarily due to diabetes. Further investigations and a critical survey of the history of such a case are essential for the accurate elucidation of the cause of the condition.

We have to thank Captain H. S. Morton, R.A.M.C., for the clinical history of this case, and Surgeon-General J. Dallas Edge, C.B., A.M.S., commanding the Queen Alexandra Military Hospital, for permission to publish it.

THE RECURRENT TYPE OF "TRENCH" FEVER IN MESOPOTAMIA.

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THE following case came under my observation recently at Amara, in Mesopotamia.

The patient, an officer aged about 36, was employed at the advanced base and had never been to the fighting line; he had been pulled down a little by one or two attacks of diarrhœa. Towards the end of April he had an attack of fever lasting two or three days, unaccompanied by rigor, and almost certainly not malarial. It seemed to belong to the category of short fevers, of which there were many examples in Amara. These attacks were generally traceable to exposure to the sun, which was beginning to get hot at that time. In this case the fever passed off, leaving the patient perhaps a little more vulnerable to the sun than before, but without definite sequelæ. Soon after a small degree of foot-drop developed in the right foot, with some anæsthesia of the dorsum of the foot, but this did not seem to have any direct connexion with the febrile attack which had preceded it.

About the middle of May, after a day of premonitory malaise and depression, the temperature ran up one afternoon to 103° F. and over. There was some mental excitement, the back and head ached, and the fall of temperature which soon followed was accompanied by a drenching sweat. After a couple of days in bed the patient returned to duty, but felt very tired and slack. Just a week after this last febrile attack another one developed. The fever was not so high, but it lasted two or three days. The pains accompanying it in back and limbs were more pronounced. Four similar attacks followed at intervals of exactly six days. Each attack exhibited a little less fever and a little more prostration than those which preceded it. In the later ones the pains were more pronounced, especially in the shins and tarsal bones. These pains were much aggravated by walking, and at night they were sometimes severe enough to prevent sleep. Latterly they tended to persist after the febrile bout was over. Possibly there was a fifth attack, but if so the rise of temperature was slight. As it occurred, if at all, during transfer from one hospital to another, this slight rise may have been overlooked.

In all, therefore, there were six pyrexial bouts. None of them were marked by definite rigor. There was always a day of premonitory discomfort. During the two earlier apyrexial intervals the patient felt comparatively fit, but each returning attack, though in itself less severe, induced a progressive loss of strength and flesh, the latter amounting in all to nearly one quarter of the total body weight. He became very pale and a little short of breath on exertion. The pulse was persistently quickened. The bowels were constipated and the urine normal. The foot-drop already alluded to cleared up slowly with the rest in bed.

The blood was examined several times. No spirilla or other protozoa could be found. Cultures were negative and agglutination results equivocal. There was a mild polynuclear leucocytosis between the fifth and sixth attacks.

Many suggestions were offered as to the diagnosis. My own view was that it might be one of the spirillar group of relapsing fevers, but this was negatived by the blood examinations, made by no less an authority than Major F. P. Mackie, I.M.S., whose researches into these diseases are well known. Captain Jamieson, R.A.M.C., recognised the similarity of the symptoms to those which had been described in Flanders under the heading of "trench fever." I was not at that time familiar with this syndrome, but since returning to England and being transferred to France I have seen a number of cases of a recurrent fever which closely resembles the pyrexial illness described above.

Two other cases of a similar fever came under my notice in Mesopotamia, but I have no satisfactory notes of them. In none of the three cases was any treatment effective save evacuation from the country into a cooler climate. This corresponds with general experience of the disease: nothing does much good except rest, plenty of food, and all the other ordinary means of increasing resistance to infection.

The causation is obscure. That the climatic factor may be ruled out is proved by the occurrence of the disease in Mesopotamia, in the Balkans, in the British armies in Flanders and in the French armies in the field, and in the troops on the Volhynian front. So far as the biting insect factor is concerned, Mesopotamia is certainly one with the other war areas; except that there are added various other torments of this description to those which usually adorn the person of the soldier in the field. The whole problem is well worthy of investigation, as the disease may inflict prolonged invalidism on the soldier. Fortunately there do not appear to be any permanent sequelæ.

[1] Cammidge, P. J.: Glycosuria and Allied Conditions, p. 214. London: Edward Arnold. 1913.
[2] Loc. cit., p. 169.

A PRELIMINARY CONTRIBUTION ON "P.U.O. (TRENCH FEVER)."

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AND
R. P. WELDON, L.R.C.P. & S. IREL.,
CAPTAIN, R.A.M.C. (T.C.); PATHOLOGIST, NO. — GENERAL HOSPITAL.

ALMOST the only real contribution to our knowledge of this disease, somewhat unfortunately termed "trench fever," which has been published, is contained in the report of the very careful and valuable work carried out under the guidance of Colonel Sir Wilmot Herringham, R.A.M.C., by Captain J. W. McNee, Captain R. J Arundel, Captain Renshaw, and Captain E. H. Brunt. Stated briefly, they have told us that this disease is almost certainly due to an organism which is probably contained in the red corpuscles of the infected persons and that the corpuscular elements of the blood alone are capable of containing and transmitting the disease. This valuable discovery is quite in accordance with what one would expect, judging by the clinical characters so markedly shown in typical cases, and which, in certain respects, are not unlike attacks of malaria. In the main, one would outline these as follows: Sudden onset occasionally with chill. Onset with indefinite but well-marked weakness and malaise, frequently indescribable so far as the patient is concerned, who, when pressed to an extremity in so many instances says, "Well, my legs would not hold me."

Pyrexia, severe or slight, irregular, tending to intermit, and with a well-marked suggestion of periodicity of from two or three to five days. Pains, characteristically lumbar, head or legs, all or any, at onset, "shins" later and with extraordinary consistency; vomiting may occur. In character the pains are best exemplified in these so-called "shin pains" and are of a severe boring character and neuralgic in type, being very frequently associated with marked tenderness of the nerves of the calf, including the external popliteal where it passes round the neck of the fibula, where it is frequently exquisitely tender to pressure. The pains are not necessarily confined to the shins, but may extend above the knees as far as the thighs, *missing the joints*.

Certain negative signs and symptoms of great value, when differentiating from the minor maladies, are freedom from catarrhal conditions of the upper and lower respiratory tracts, absence of dryness or furring of the tongue, even with a temperature of 102° or 103° F. The pulse is remarkably stable, and the general feeling of the patients whilst in bed is summed up best in the words they frequently used, "If it were not for this headache I should be alright," or, "If it were not for these pains in my back I should be alright"—a mental attitude which is, in the opinion of the authors unheard of in the typhoid and paratyphoid infections. The spleen is certainly not usually appreciably enlarged either to palpation or percussion. Bowel symptoms we believe not to be characteristic of the condition, though frequently amongst troops, as one would expect, one sees it associated with slight attacks of diarrhœa.

On the course of the disease we cannot speak with confidence, but it would appear that in the majority of cases at least three exacerbations of fever take place extending over an interval of *not less than two weeks*. The pains are, unquestionably, frequently severe and persistent, though not disabling. The blood shows an absence of any ascertainable growth on ordinary media. A count shows moderate leucocytosis only, with some increase of the large lymphocytes, and an absence of eosinophilia and shows no recognisable hæmatozoa.

One feels it necessary in describing what, to most of us, is a new disease, to emphasise the importance of taking into consideration all the aspects of the case and not to rely upon the presentation of a typical temperature chart or the presence of typical "shin pains" or any other single characteristic, a mistake which is frequently made With this reminder we are convinced that we have in this condition a disease of undoubted individuality quite distinct from, and in the vast majority of cases easily differentiated from, influenza, common cold bilious attack, and myalgia, on the one hand, and the enteric group, malaria, and rheumatic fever on the other, and, in its typical instances, as easily diagnosed as any better known disease, and in its atypical cases well recognised by those who have studied such numbers of cases as the medical division of any large base hospital must provide.

With regard to treatment, it would not appear that any remedies yet tried have materially modified the course of the disease, and this fact combined with the leakage of men which the wide prevalence of the disease appeared to us to cause, led us to a belief in the extreme importance of prophylaxis. Our attention was thus drawn to the mode of transmission, and with the data provided by the workers already mentioned in our possession, and also the clinical fact that direct transmission in hospital appeared not to exist, it seemed to us that the direct transmission of red corpuscles must be brought about by blood-sucking parasites. The wide prevalence of the "louse," as has been so thoroughly investigated by Lance-Sergeant A. D. Peacock, R.A.M.C., led us to the belief that these pests were the guilty agents.

An experiment was therefore carried out with a view of testing the accuracy of this belief. Some score of lice were collected and starved in captivity for three days; a number of them died. Two pairs of the survivors were taken and allowed to bite, under a watch glass, two patients suffering from "trench fever" in an acute stage. After allowing them to feed for about 15 minutes their meal was interrupted, and each of us then allowed a pair to feed upon himself, strictly confining their sphere of operation by means of a securely fixed watch-glass. The one of us whose duties did not bring him into the wards subsequently, 24 hours later, allowed his pair to have a further meal on himself. Twelve days later very startling developments took place. The characteristic symptoms manifested themselves, and he passed through a most typical attack of the condition of average severity, with the pains and other features all present. It may be further noted that the victim had not at any time been nearer to the front than the base, nor had he been subject to any previous similar condition.

The demonstration of this mode of transmission appears to be so striking in its success and of such immediate importance that we feel amply justified in giving what is an academically incomplete research on the etiology of this important disease. The probability is that a vigorous impulse to the anti-louse campaign may be given.

Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

ACUTE PNEUMONIA WITH HYPERPYREXIA. FOLLOWED BY HEART-BLOCK.

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ACUTE pneumonia with severe hyperpyrexia is so rare, and recovery from this rarer still, that on that ground alone it would seem desirable to record this case, in which also the fever was followed by a high grade of heart-block.

A van boy, aged 14 years, was admitted into hospital under my care on Nov. 22nd, 1916. He was a healthy looking boy, with a good family and personal history. He had been taken ill with a rigor and fever and cough four days previously. On admission the temperature was 104° F. and at 4 P.M. it had risen to 105°. There were signs of pneumonic consolidation in the whole of the lower lobe of the right lung. The patient's general condition was good. At 7 P.M., however, the temperature, taken in the mouth, registered 110°; it was taken in the rectum by two different thermometers and found to be 110° each time. On being informed of this by telephone I ordered the immediate use of iced sponging and towels. Towels wrung out in iced water were placed over the front of the trunk, and changed in succession when they became warm, and the limbs were sponged with iced water. In this way the temperature had fallen to 101° when I arrived at the hospital. The treatment was then stopped. The general condition of the patient was good, he had not been delirious or unconscious. The pulse was 120, regular and of fair volume, and there was no sign of collapse. I ordered an ounce of brandy in warm milk. The temperature was then taken each half hour and began to rise again, and at 9 P.M. was 103·6°; the cold sponging and towelling again reduced it to 103·8°, after which it slowly fell to 101°, but next day it varied between 104° and 105°, and after this until the crisis on Nov. 27th it showed no tendency to rise to an abnormal height. The course of the illness was uneventful, until on Nov. 30th, two days after the crisis, the pulse had sunk to 44. When I saw the patient the same day it was beating at that rate at the wrist. The heart's apex was not displaced, and there were no abnormal sounds heard; but I was able to show by a paper lever over the jugular vein that the auricular rate was 88 while the apex beat registered 44. The pulse was of good volume and perfectly regular in rhythm. This passed off after 48 hours, and I regret that I was unable to procure the use of a polygraph early enough to get a permanent record. After this the pulse-rate gradually rose, and was intermittent, at first every three or four beats, but getting less and less so daily until a week later when the rate was about 80, and only very rarely could an intermittency be felt at the wrist or the apex. The signs in the lungs cleared up in the usual way, and the only other feature worth noting was that the pulse rate increased considerably when the patient was first allowed out of bed, so that his convalescence was retarded in this respect for about a fortnight.

A temperature of over 106° F. is exceedingly rare in acute lobar pneumonia but commoner in broncho-pneumonia. The percentage in the former disease is said to be 0·4, and with only one or two exceptions seems to have been fatal in all the recorded cases. The fact of recovery after the temperature twice reached an extraordinary height seems, as far as I can make out from the literature, to be almost unique.

It was found that whenever iced towels were renewed over the præcordial region the pulse became markedly more feeble.

and hence on the second treatment with ice this area was omitted; if this be confirmed in other cases it will serve as a useful warning.

With regard to the heart-block, it is known that minor degrees, such as lengthening of the a.-v. interval, may often be demonstrated by the polygraph, though they cannot be detected by rougher methods; but such a marked degree as a 2 to 1 block must certainly be very rare indeed. Though Mackenzie mentions that heart-block may occur after pneumonia, he does not state to what degree. It would seem that the poison which had such an unusual effect on the heat regulation had also an unusually severe effect on the heart muscle, impairing its conductivity as well as its strength.

A CASE OF FOREIGN BODY IN THE RECTUM.

By N. S. BONARD, M.D.,

LATE SENIOR HOUSE SURGEON, FRENCH HOSPITAL, LONDON; SURGICAL OFFICER, THE LONDON LOCK HOSPITAL.

I READ with much interest in THE LANCET of Sept. 23rd, 1916, the case of foreign body in the rectum related by Mr. Joseph F. Peart. The following case may be interesting to relate in connexion with his paper.

The patient, a man aged 23 years, came to see me at the French Hospital giving the following history. Ten days previously he was in the lavatory playing, as he said, with a long piece of iron, when suddenly it disappeared. He could not find it again, so he believed it was in his rectum. During the ten days he had no special troubles or pain, but he was much upset in thinking that perhaps he might have a piece of iron in his body which did not come out. The general appearance of the patient was strange, and at first I did not believe a word of this history and took him for a maniac or a person mentally deficient. I asked him to get upon the gynæcological chair, and made a very careful examination. Externally there was no evidence of anal or perianal lesions or inflammation. By digital examination I could not feel anything abnormal, and did not cause the slightest discomfort or pain to the patient. So I came to the conclusion that he was really mentally deficient. When he was dressed again I explained to him that he was wrong and that he must give up this ridiculous idea of thinking he had a piece of iron in his rectum, and that it would be impossible to retain such a thing for so many days in his body without having any trouble. I was on the point of sending him away when he again gave me in a few words his previous history, telling me that as he could not find this piece of iron in or around the lavatory it was certainly in his rectum. He refused to give any further details, and described the body as being as long as his forearm and as thick as his little finger. Again I did not believe it, but bearing in mind the classical descriptions in medical books regarding foreign bodies which can be found in the rectum I made a second examination with all my strength, so as to examine as high up into the rectum as I could. I was not more successful than the first time, and was just going to give it up when suddenly very high up my finger went against something very hard on the lateral wall of the bowel. I lost it, and for a long time could not find it any more. I was so certain that what I came against was a foreign body that I began to think that after all the patient might be right, and I made a third examination. After a few minutes I was lucky enough to find again the hard body, but could hardly reach it with the extremity of my finger. I moved it as well as I could, and after manœuvring with it I felt it more movable and coming slowly down the bowel. Then I could feel at last the extremity of a piece of iron exactly as the patient said. I could not appreciate the length, but as it was impossible to move it easily, I gathered it would be rather long. By moving it little by little I succeeded in getting the lower extremity near the internal sphincter, but as soon as I withdrew my finger the body was returning to its previous position against the lateral wall where it was impossible to grasp it for extraction. At last I used a gynæcological Fergusson metal speculum, and with a long forceps, after many unsuccessful attempts, I was able to extract a long cylindrical (with sharp-cut ends) piece of iron, 9½ inches long and as thick as the little finger. I must say I was very surprised, and the patient was very pleased that it had come out. Fearing complications the patient was kept under observation for a few days but no troubles whatever ensued.

The purpose for which this piece of iron was being used by this young man need not be dwelt upon, but I record the case to put other medical men on their guard in face of an apparently improbable story.

ERRATUM.—In Table III. of the Analysis of Recent Cases of Tetanus (THE LANCET, Jan. 27th, p. 133) Case O.3 should read: "F.B. lodged in *ilium*."

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SECTIONS OF MEDICINE, PATHOLOGY, AND EPIDEMIOLOGY.

Discussion on Toxic Jaundice in Munition Workers.

A COMBINED meeting of these sections was held on Jan. 23rd, Surgeon-General H. D. ROLLESTON being in the chair.

Dr. T. M. LEGGE said that, in the early stages of the war, poisoning by dope which contained 12 per cent. of tetrachlorethane looked as though it were going to be formidable. Nineteen cases had been detected in one factory in quick succession. That the tetrachlorethane was the culpable ingredient of dope had been shown experimentally by Dr. W. H. Willcox, and the plenum system of ventilation then in vogue in the workshops was unsuitable. The danger had been combated by periodical medical examinations, installation of exhaust ventilation, and frequent changes of employment. The tetrachlorethane had now been replaced by a substitute which was safe. From first to last about 70 cases had been heard of, with 12 deaths. Concurrently, two or three cases of toxic jaundice due to T.N.T. occurred, and this form of jaundice was made notifiable. Consideration of the cases showed, as was to be expected, that to reduce the poisoning the dose must be reduced. At first only a few cases occurred, then with an intensification of the work, which coincided with the hot weather, there were more; in the last two months of 1916 there were fewer cases again. The incidence had been where the material was used, rather than where it was made. The skin was the main channel of absorption, as shown by the occupations of those affected. A method of exhaust ventilation could only indirectly reduce the danger from skin absorption. In addition, mechanical aids to diminish the need for handling the material had been employed. Other safeguards used were alternation of employment, periodical medical examination, and cleaner working, and these, with suitable ventilation, were the chief methods of control.

Viscount CHETWYND, managing director of a large factory, wrote saying that it was in the interest of a factory that sickness should be kept down, in view of the reduction of labour. He was led to believe that poisoning was due to fumes rather than to dust. This was shown by the example of a group of men who worked covered with dust but with easy access to the air. No cases arose among them. In another group who worked where the circulation of air was poor and fumes were more evident, the incidence of cases was 9·3 per cent. With better ventilation this percentage dropped, a similar reduction being noticeable also after a gale. There were more gastric cases among women than among men, who fed themselves better. Consequently a part of the wages of the women was withheld, and they were efficiently fed; this was followed by a reduction of cases from 11·6 per cent. to 1 or 2 per cent. Although the amount of wages withheld did not cover half the expense of feeding them, the improvement in their health made the transaction financially successful.

Professor BENJAMIN MOORE said that the minor illnesses arising from T.N.T. were of very great importance. The number of absentees from this cause at one factory was high. It was his fixed belief that it could be eliminated. He had kept animals in dense fumes for considerable periods, but they remained well. He then noticed that in a very clean factory where workers had oily hands cases occurred. Next he provoked poisoning symptoms in himself by rubbing an oily preparation of T.N.T. into his palms. In a factory he had breathed fumes and dust very systematically, but had not induced any poisoning. Most poisoning occurred among the workers who rubbed off the spilt material about the shells which should never have been there. There was an attitude of false security about the handling of T.N.T. because it was so little explosive. There should be as clean working with T.N.T. as with black powder or petrol. As preventive measures cleanliness came first, then alternation of

employment. During the periods of cessation of work with T.N.T. there must be cleanliness of the skin, changing of underclothing, and cleansing of the scalp. An organic solvent such as acetone should be used to remove the material from the skin and scalp as far as possible. The greater the degree of the cleanliness observed the less would be the incidence of illness. There should be a penalty for careless handling and if the floor became littered with dust.

Dr. B. H. SPILSBURY described the post-mortem and microscopical changes found in cases of tetrachlorethane, dinitro-benzene (D.N.B.), and T.N.T. poisoning. He pointed out that in all cases the most advanced changes were found in the liver. In large areas of this organ the cells had almost or entirely disappeared, the stroma remaining, and showing in some cases processes of organisation, with fine globules of fat as sole evidence of the previous fatty degeneration of the cells. The bile-ducts in some cases remained, and might show active proliferation and even slight attempts at regeneration of the liver tissue. The areas in which the liver tissue had not disappeared might show some hypertrophy of the liver cells, but these generally exhibited a varying degree of fatty degeneration. In all cases the kidneys exhibited fatty degeneration—generally widespread and advanced—and in most cases there was fatty degeneration also of the heart muscle. Experiments in rats with the vapour of tetrachlorethane, conducted by Dr. Willcox and himself, had shown that on exposure to the vapour for one week a marked fatty degeneration of the liver developed and less of the kidneys and heart, the other organs showing no pronounced alterations. These experiments suggested that the earlier stages of tetrachlorethane poisoning in man consisted of fatty degeneration, which in the liver led to complete destruction of many of the liver cells before death.

Dr. MATTHEW STEWART spoke of the blood changes and of the microscopical appearances of the organs. His paper was published in full in THE LANCET of Jan. 27th.[1]

Dr. P. N. PANTON dealt with the blood changes. He had examined the blood in the case of 50 women in one factory who were still at work and apparently well. No blood changes were found except those of minor importance. The majority showed some leucocytosis, chiefly of polymorphonuclear cells. There was no suggestion of blood destruction in contra-distinction to what had been described in poisoning by D.N.B. One hundred workers had been examined for cyanosis; 18 were definitely cyanosed, others were blue, but possibly because the day was cold. The cyanosis had been generally ascribed to methæmoglobinæmia, but he did not consider that this had been proved. He had used Haldane's test, with which 36 examples of blood were positive, but the conclusiveness of the test was difficult to be sure of. Of 100 workers, in 20 the serum was bile-tinged without evidence of jaundice, but this sign was also present in a certain number of normal people. Of 19 cases of poisoning with T.N.T., 15 of whom had toxic jaundice, nothing abnormal was found in the blood in 13. Two conditions might occur, in his opinion, with T.N.T.—(1) toxic jaundice, (2) an aplastic anæmia. He had seen four cases of the latter, two with jaundice and two without it.

Dr. H. M. TURNBULL had examined post mortem seven cases of toxic jaundice caused by T.N.T. In six of these the least damage in the liver was in the anterior part of the right lobe; in the seventh the most affected portion was the upper part of the right lobe. The destruction was greatest in the parts most remote from the portal blood-supply. The condition resembled portal cirrhosis of the liver in the patches where the destruction was not complete. In some cases there was regeneration. The changes had not always been progressive. In one case a large liver was met with, showing only three very small areas of complete destruction and elsewhere reticular fibrosis. Another case was one of very severe anæmia without jaundice, and was erroneously thought to be an example of pernicious anæmia. The liver showed fatty degeneration in the centre of the lobules as occurs in severe anæmia (there was no iron), but in another part the lesions were like those of T.N.T. Two other cases of men with extremely severe anæmia were examined. They were examples of aplastic anæmia, and very little marrow was found, but in it were many plasma cells and phagocytes containing chiefly erythroblasts. There appeared to be an actual destruction of the marrow by the poison.

Mr. I. FELDMAN raised the question of the possibility of another toxin being present in T.N.T. cases, and thought that Webster's test should not be regarded too absolutely as determining the existence of T.N.T. poisoning. He cited a case which had occurred seven weeks after the last exposure to the poison, and in which no trace of T.N.T. was found in the urine or fæces. In two animals which had been poisoned with T.N.T. no trace of T.N.T. was found in the organs, and in a fatal case the same absence of T.N.T. in the organs was met with. Among the early symptoms were a very definite dark-brown colour of the urine before jaundice was noticeable, urgency in micturition, and lassitude, the patients feeling faint and weak. A later symptom in one case was the appearance of leucin and tyrosin crystals in the urine. The metabolic activity of the liver was not affected as far as urea was concerned.

Dr. W. J. O'DONOVAN dealt with the clinical aspects. The typical manifestations could be classified into five groups: (1) Dermatitis; (2) an irritative gastritis evinced generally during the first week of employment, and cured by simple treatment and a few days' holiday; (3) a toxic gastritis; (4) effects upon the blood and blood-forming organs; and (5) toxic jaundice. Toxic gastritis was due to T.N.T. absorption; its symptoms were colicky epigastric pain, often severe, and having no relation to meals, constipation, anorexia; wasting and sometimes vomiting were associated symptoms. It was difficult to diagnose this from gastritis due to other known causes, but the wizened pallor of the face of these T.N.T. cases was very striking. Another common sign of T.N.T. absorption was cyanosis, but neither this nor gastritis were reliable warnings that jaundice might supervene. Of 30 cases of toxic jaundice, in 15 the jaundice was the first sign to call for notice. In 1916 about 50 deaths had occurred from toxic jaundice, a mortality among those exposed of 0·05 per cent. The total sickness incidence had in one factory been as high as 11 per cent., but the sickness incidence and the mortality rate in cases of jaundice had both steadily lessened. Jaundice might supervene at a very early or late period of employment, from the fourth day to the ninth month, and it might first appear after an absence up to two months of freedom from exposure to absorption. The prognosis of a case of toxic jaundice was uncertain; when recovery was expected coma or convulsions might suddenly supervene. But with the early detection of icterus the prospects of the chances of recovery were much greater. A second attack should not occur, because a return to T.N.T. work on recovery from toxic jaundice was forbidden, but he had seen one such case; in this the man after a return to T.N.T. work became again icteric and in addition very pale; the serum contained bile pigment and the blood showed a marked absence of bone marrow reaction. Since Professor Moore's investigations were reported great attention had been paid to the prevention of the possibilities of skin absorption.

Mr. J. A. P. BARNES said that an observation of 1100 workers had borne out in the main the contention that the channel of absorption was chiefly the skin. He had found that among employees working with greasy hands the incidence had been 17 per cent., as compared with 10 per cent. among others. In two groups of workers the hands were brought into close contact with the powder. Among these there were toxic symptoms in 10 per cent.; in all the others this occurred in 1 per cent., in spite of exposure to fumes in the case of some of them. He thought that the mucous membrane was also a channel of absorption in the case of women who wore suction plates, between which and the mucous membrane a sandwich of powder collected and remained all night, as the women were often advised by the dentists not to remove these plates at night. Girls, after a few days at the work, often suffered from severe mental depression; this was afterwards replaced, when serious jaundice occurred, by a state of exaltation, probably toxic, and reminiscent of the spes phthisica. He hazarded the suggestion that excretion plays a large part in the elimination of the toxicity of T.N.T. He had transferred a group of ten workers from a well-ventilated building to one less well ventilated and more confined; they deteriorated in health, while those who replaced them, coming from the worse ventilated building, improved considerably. He had endeavoured to find out whether any after-effects occurred in those who had formerly worked on T.N.T., and constipation was commonly complained of.

[1] In commenting last week upon this paper we alluded to 12 cases of accidental death in munition workers which Dr. Stewart had studied. In one of these distinct liver changes were found. But the main conclusions of the paper were based upon the examination of seven fatal cases of T.N.T. poisoning.

Dr. W. R. SMITH gave his experiences in a shell-filling factory. Up to Jan. 20th there had been 62 cases of toxic jaundice with 16 deaths, 10 in men and 6 in women. Six cases had occurred in youths under 18, with 4 deaths; the employment of juveniles was then stopped. There had been a steady falling off in the number of cases due to several factors, the most important being efficient ventilation. Another beneficial factor was the introduction of intervals during the shifts for relaxation, feeding, and walking about. All the women were supplied with two good meat meals daily. Thorough preliminary examination of employees had been introduced and free dental advice and treatment provided on the spot. Finally, pressure had been applied to make the cases report earlier. A most striking clinical feature was the reluctance of most cases of toxic jaundice to admit that they were ill in the early stages. No dermatitis had been met with among the jaundice cases. Nausea and anorexia were usually present early. Constipation was almost invariable. Purpura occurred in three cases; in one around the nail-beds, in one in the mucous membrane of the mouth and lips. Drowsiness and sometimes maniacal violence occurred. In one case tetanic convulsions and opisthotonos simulating cerebro-spinal fever were met with. Absolute rest in bed was essential even in the mildest cases. $CaCl_2$ might be used if there was any suggestion of hæmorrhage.

Major O'REILLY said it was noteworthy that no ill-effects from T.N.T. had been noted before the war, even among juvenile workers. The cutaneous affection was most frequently met with during the first week of exposure, the hands, wrists, face, and neck, and occasionally the ankles being the chief sites. Itching occurred. It was followed by a fine desquamation and was not generally severe, but yielded to simple ointments. The toxic effects presented themselves in three forms: the gastric type (usually with cyanosis), toxic jaundice, and the anæmic type. These were not different stages, but distinct types. The gastric type occurred at all periods of exposure and was marked by listlessness, pallor, cyanosis, an icteric tinge of the conjunctivæ, depression, nausea, giddiness, faintness, pain behind the xiphisternum, and constipation. It was remediable by suitable treatment and left no after-effects. The chief diagnostic aids were constipation, the pallid pinched appearance, and the epigastric pain. He had not seen the toxic jaundice form emerge from the gastric form. It appeared suddenly and did not differ at first from ordinary catarrhal jaundice. The liver might be enlarged in the early stages. In three fatal cases meningeal symptoms appeared, leading to coma and death. The anæmic cases looked like examples of pernicious anæmia, but though the colour index might be high there were no nucleated red cells. Speaking of the treatment, he said that the use of acetone had been encouraging. From the point of view of prevention, great attention had been paid to the teeth, which were inspected once a week. Gloves, veils, and respirators were supplied, and change of employment given fortnightly. The workers were warned to change their clothes when at home. Milk was supplied free. Washing of hands was insisted upon, and ointment was supplied in each workshop.

Dr. MORLEY FLETCHER referred to a case of toxic jaundice under his care in hospital in which saline infusions and venesection had had no beneficial effect in contradistinction to what he had experienced in cases of acute yellow atrophy. The blood was noticed to be very tarry. He queried whether these methods had been useful in other cases and whether they should be employed in early stages. The cerebro-spinal fluid had been found bile-stained after death in a case in which it was clear during life.

Fleet-Surgeon R. C. MUNDAY, R.N., recorded his experiences in the Admiralty munition establishments. There had been a complete immunity from toxic jaundice; this he explained by the greater degree of cubic space provided, the absence of piecework, better discipline and cleanliness, and better ablutionary arrangements. He thought it was better to remove the fumes from their source than from the bottom of the room. Alternation of work was provided very fully. Scrupulous cleanliness was observed and soiling of shell-cases was prevented. There was an absence of dust on the floors. The workpeople were clean. He agreed that the skin was the chief channel of absorption. At the naval air stations no case of dope poisoning had occurred, the alternation of work among those employed being very perfect.

Dr. EMMA C. PILLMAN said that it was difficult to state when toxic jaundice started, as 15 per cent. of women workers had yellowness of the conjunctivæ, probably due to constipation, before commencing work. All cases of jaundice could not therefore be notified with advantage.

Dr. MARY A. S. DEACON and Dr. H. G. P. CASTELLAIN concurred as to the frequency of bile-tinged conjunctivæ before exposure to T.N.T.

Reviews and Notices of Books.

1. *The Diagnosis and Treatment of Heart Disease.*
By E. M. BROCKBANK, M.D.Vict., F.R.C.P.Lond. Second edition. London: H. K. Lewis and Co. 1916. Pp. 120. Price 3*s.* 6*d.* net.

2. *Clinical Disorders of the Heart Beat.*
By THOMAS LEWIS, M.D.Lond., F.R.C.P.Lond. Third edition. London: Shaw and Sons. 1916. Pp. 116.

1. WE welcome the second edition of this excellent little manual on "The Diagnosis and Treatment of Heart Disease." As a practical guide to examination of the heart we know nothing better. The pages dealing with treatment are also most helpful, giving a very complete outline of principles and a survey of the various remedies found by experience to be of benefit. We congratulate the author upon such a sane combination of the older methods of clinical examination and the newer introductions of the electro-cardiogram school. No doubt the explicit directions and the care spent upon the detection and elucidation of heart murmurs will seem matters of supererogation to those who regard these morbid signs as of less value in the study of heart disease than was formerly taught, but we are in agreement with the author in this matter. The section dealing with the significance of the patient's symptoms is full, as is also the account of the arterial and venous pulses; the chapter on cardiac irregularity serves as a clear introduction to this more recent branch of heart observation. Amongst many points which we read with satisfaction we note the emphasis put upon the need for searching carefully for an aortic diastolic bruit in any suspected case of aortic regurgitation, and upon the fact that such bruit is very often heard only down the left margin of the sternum. There is a useful paragraph upon "posture murmur," another upon what the author terms the "apprehensive heart," and a third upon the effects of rheumatism upon the heart in children. These are only three of many such helpful paragraphs. There is very little of criticism to say. But on p. 23 "sounds" are spoken of as being "felt"; and on p. 94, speaking of acute pericarditis, the sentence "its presence is recognised by the associated endocarditis, by some respiratory distress, and by pericardial friction," might be re-written with advantage. On p. 45 the reference (p. 46) should be (p. 37).

2. The third edition of Dr. Lewis's little work follows speedily upon the second, and the fact shows clearly the importance of, and interest taken in, the newer study of heart disease by means of special instruments. We have recently[1] dealt fully with Sir James Mackenzie's latest statement of his work and of his experience in this direction. Dr. Lewis's book gives the student and the practitioner a clear synopsis of the facts up to date and an exposition of current hypotheses to explain them. The author writes with a lucidity and with an accuracy in the use of words that serve to simplify what many readers find a very difficult subject. His early chapter on the common types of disorder of the cardiac mechanism and their meaning serves admirably as an introduction to the subject, and by its simplicity it coaxes the student into the more serious parts of the subject that follow. These parts are dealt with under the headings: Sinus Irregularities, Heart-block, Premature Contractions, Paroxysmal Tachycardia, Auricular Flutter, Auricular Fibrillation, and Alternation of the Pulse. The material of the book is so arranged that it is quite possible for the reader to omit any close study of the various curves which illustrate the text and still to preserve continuity in the argument. Indeed, we think this method of reading the book might be quite a good one for the student or practitioner to whom the subject of heart irregularities is

[1] THE LANCET, 1916, ii., 477.

new and its nomenclature strange. The practitioner with clinical experience will have little difficulty in co-relating his own bedside and consulting-room observations with the author's admirable generalisations. At the second and later perusals of the book the technical details of the electrocardiogram tracings can be studied by the help of what is still an unfamiliar terminology. In connexion with each of the above types of disorder of the heart mechanism the author discusses prognosis and treatment, and these sections are written with the same careful clearness as are those dealing with diagnosis. We recommend the book very heartily, and we are not surprised to find that it has been in such demand as to necessitate this new edition.

The Cure of Obesity and Obese Heart.

By J. S. KELLETT SMITH F.R.C.S Eng. London: J. and A. Churchill. 1916. Pp. 93. Price 3*s.* 6*d.* net.

IN this small book Mr. Kellett Smith has dealt fully with the principles and practice of the treatment of obesity by passive ergotherapy, more generally known as the Bergonié treatment. But although this particular method of treatment is the chief *motif* of the book, the author shows his freedom from any sort of obsession by giving due prominence to the question of diet, of voluntary exercise, and, in special cases (for the due recognition of which he gives very useful directions), of the administration of thyroid extract. Indeed, the author emphasises the importance of combining the various known principles of treatment of this particular metabolic defect. Exact details are given of the mode of application of the special faradic current used to cause the muscular contractions, and the immediate and remote effects are duly recorded. In the case of fatty heart the use of graduated exercise in conjunction with the Bergonié treatment and dietary is described fully. We cordially recommend this monograph to all practitioners who have to deal with obese subjects.

Eclipse or Empire?

By HERBERT BRANSTON GRAY, D.D. Oxon., and SAMUEL TURNER. London: Nisbet and Co., Limited. Pp. 316. Price 2*s.* net.

MUCH in this book may be studied with advantage. The authors' text is: "Forty years ago Great Britain was still the workshop of the world. To-day she is not"; and they show where "she is not" and why "she is not." Their arguments are familiar, and their force and truth will be recognised in intelligent circles. The facts contained in a glossary of 179 pages out of a total of 307 afford most interesting and serious reading, and disclose that a large proportion of the new ideas and inventions which have been evolved during the last 40 years have been due to other nations than our own, and in so many (too many) instances where inventions have been British their value and utility have been more greatly appreciated and supported in foreign countries than at home. This is not as it should be, and the authors' aim in bringing these facts forward is to drive the nation out of its apathy, so that we may resume that supremacy which we once held and be prepared for the alarm of peace—for the trade war which will follow the war of armies and navies. On the whole the authors make out their case with success, but occasionally they are inclined to discount the rôle of the British too heavily. Under the title of "The Healing Art," for example, they state that there is clear evidence that the new ideas, discoveries, and developments in this branch of human activity have, for the most part, had their source abroad. We do not think this is a correct interpretation of facts, even when considering their own analysis of historical developments, and the Germans, at all events, do not figure so conspicuously in the list as do other nations. The British, at any rate, may lay claim to initiative in their work on cholera, malaria, typhoid, Malta fever, cerebro-spinal meningitis, and sleeping sickness, while German investigation has borne chiefly on diphtheria and syphilis. The X ray discovery by Roentgen, again, was based on an English vacuum tube and the dynamo was Faraday's wonderful conception. In many cases, however, it is right to claim that the superstructure of a discovery made in this country has been reared largely by German scientists. This is the main lesson for us to learn, and we are rapidly learning it, as is shown by our increasing output of chemicals, dyes, glass, and other products formerly supplied to us exclusively by the enemy. The book is very plain in its teaching and the subject-matter should receive a widespread and careful study. It provides an interesting balance-sheet, showing fairly, on the whole, our industrial position in the world's affairs, and our position is certainly not always to our credit.

JOURNALS.

British Journal of Inebriety.—The issue for January contains an interesting and valuable article by Dr. J. W. Ballantyne on Alcohol and Ante-natal Child-Welfare. In his discussion of the subject Dr. Ballantyne, following the convenient method adopted by him in previous work, subdivides ante-natal life into three periods—the fœtal period extending over seven months prior to birth, the embryonic period, comprising the earlier phase subsequent to the conjunction of the ovum and the spermatozoon, and the germinal period stretching away back into the lives of the parent organisms. The influence of alcohol circulating in the parental blood is different in degree in these different periods. In the fœtal epoch the developing off-spring has an intimate and highly specialised relationship with the mother through the placenta, which probably to some extent impedes the free access of alcohol to the fœtus. Dr. Ballantyne notes that the experimental evidence regarding the filtering power of the placenta is in some points conflicting; he leans to the view of Nicloux that alcohol passes through the structure freely, but he considers that the fœtal tissues at this stage are fairly resistive, so that the damage done by the drug is less than when it acts on the embryo or the germ cells. As confirming this view he remarks that clinical evidence has shown that the elimination of alcohol in the second half of pregnancy may be followed by the birth of healthy children, even to mothers whose procreative career, under the influence of alcoholism, had already shown still-births and abortions. With regard to the effect of alcohol during the embryonic period, it is difficult, from the nature of the case, to get experimental data in mammalian animals, and most of the work bearing on the question has been done on the hen's egg. The most extensive and important researches in this department—those carried out by Charles Féré—gave conclusive evidence of the power of alcohol to retard growth and to arrest or misdirect development. Presumably, it may have a similar action in mammalians, including man; but in this connexion it is to be noted, as the author points out, that the embryo has some protection from the decidual membranes. More definite and important evidence is available as to the effect of alcohol in the germinal period of ante-natal life, and in discussing this point Dr. Ballantyne lays special stress on the recent work of Stockard, whose careful experiments he considers to be decisive. Stockard's results, taken in conjunction with Bertholet's observations regarding the pathological changes in the reproductive glands of drunkards and with the clinical data as to heredo-alcoholism, lead him to formulate the conclusion that alcohol produces its most serious and lasting evil effects upon the individual and the race in the germinal epoch. A very full and up-to-date list of the literature of the subject still further enhances the value of this very important paper. Comments on Dr. Ballantyne's article by some members of the Society for the Study of Inebriety are also given.

BRIGHTON HOSPITAL SUNDAY.—The balance-sheet of the Hospital Sunday collections in Brighton, Hove, and Preston shows that the total received amounted to £1005 8*s.* 4*d.*, as compared with £1007 6*s.* 4*d.* in the preceding year. In the allocation of the fund, the Royal Sussex County Hospital received £432, the Dispensary £118, and the Children's Hospital £90, ten other charities also participating.

HASTINGS AND MENTALLY DEFECTIVE CHILDREN.—It is satisfactory to find that the municipal authorities at Hastings are proceeding with their schemes, which were initiated in pre-war days, for the care and education of mentally defective children. A special school has recently been opened at Hastings which provides accommodation for 40 children, and those who are being specially catered for are the feeble-minded and those who are feeble because of their physical condition or the surroundings in which they are brought up.

THE LANCET.

LONDON: SATURDAY, FEBRUARY 3, 1917.

Infective and Toxic Forms of Jaundice.

IT is familiar knowledge that some forms of jaundice may occur under epidemic conditions, and as long ago as 1886 WEIL described the form of febrile jaundice associated with nephritis and splenic enlargement which has been generally regarded as the type of infective jaundice. But before this, in 1866, WEISS had described an epidemic as one of "infective jaundice," and even earlier the French school of pathologists had recognised the infective character of some of the conditions in which jaundice was the prominent symptom. Dr. A. F. HURST calls attention to this early French work in a letter in our columns this week. War often serves to spread epidemic disease and so to afford special opportunities for observation and research. In the South African War epidemic jaundice occurred among our troops, but it was variously regarded by different observers, some describing it as infectious, while others attributed it to gastro-intestinal catarrh. In the present war pathological work has been pursued far more systematically, and recently some interesting and important observations have appeared which have served to enlarge considerably our knowledge of the etiology of jaundice, and which therefore merit careful study. An interesting record of observations upon cases of infective jaundice was given in THE LANCET of Jan. 27th by Captain A. STOKES, Captain J. A. RYLE, and Captain W. H. TYTLER, and a careful analysis of 178 cases appears in the *Quarterly Journal of Medicine* (vol. x., Nos. 37 and 38) by Colonel Sir BERTRAND DAWSON and Lieutenant-Colonel W. E. HUME. In both papers due acknowledgment is made to the work of a group of Japanese observers, Drs. INADA, IDO, HOKI, KANEKO, and ITO, who, from the study of a disease associated with jaundice, hæmorrhages, and albuminuria occurring under endemic and epidemic conditions in the western part of Japan, first demonstrated the presence of a spirochæte as the causal agent. Their observations seem to be amply confirmed by the British observers, and there can be no doubt that, at any rate, some of the cases occurring among our soldiers in Flanders are identical with the disease investigated by the Japanese authors.[1]

The general clinical features of the condition are clearly delineated in both of the papers to which we have referred. Captain STOKES and his co-workers describe the onset as strikingly uniform, being acute, often ushered in by a shivering fit, and accompanied by vomiting, headache, and pains in the back and limbs. There is generally fever varying between 103° and 105° F., and often great prostration and lassitude. Jaundice seems to appear usually on the fourth or fifth day of the illness, and becomes progressively deeper until the ninth or tenth day, after which, as a rule, it fades rapidly. The tongue is dry and brown in colour. Vomiting, which is almost constant in the early stages, is frequently bilious and sometimes blood-stained. Constipation seems to be the rule in the disease, and the stools are usually bile-stained, while labial herpes occurred in 42 per cent. of the cases and invariably became hæmorrhagic. Other hæmorrhages seem to occur frequently, at any rate in severe cases, giving rise to hæmatemesis, hæmoptysis, epistaxis, and occasionally purpura. The urine is very deeply coloured as a rule, and albuminuria is almost constant, varying from a faint trace to a considerable amount. Microscopical examination shows tube casts and red blood corpuscles. In the more severe cases torpor was noticed, progressing to the typhoid state and accompanied by rambling delirium. The account given by Colonel Sir BERTRAND DAWSON and Colonel W. E. HUME is identical in almost all respects with that given by Captain STOKES, except that a gradual onset was more often noted by the former, especially in mild cases, and the liver was more frequently found to be definitely enlarged. An interesting account of the morbid anatomy illustrated by admirable plates is given by Sir BERTRAND DAWSON and Colonel HUME. The mucous membrane of the duodenum in fatal cases was found to be œdematous, congested, and dark blue in colour. There was usually swelling round the orifice of the bile duct, but the ducts themselves presented the natural appearance. Though some changes were found in the liver by Captain STOKES, they do not appear to be present as a rule. In 1914 INADA and IDO demonstrated the presence of a spirochæte in the livers of guinea-pigs infected with the blood of patients suffering from the disease, the animals developing jaundice with pyrexia and albuminuria. Afterwards they showed the presence of the same spirochæte in the blood of patients and in the tissues of some fatal cases. They also proved the presence of protective substances in the blood serum of patients recovering from the disease. Their observations suggest that in the early stages the spirochæte is in the blood stream, but that after the fifth day it gets more inconstant as the development of immune substances in the blood proceeds. After the tenth day they found the spirochæte in the urine, whence it has been recovered as late as the thirtieth day. They were of opinion that the portal of entry of the spirochæte was the alimentary canal, but admitted that there was a possibility of infection occurring through the skin. Subsequently they were able to cultivate the spirochæte outside the body. Practically all these observations have been amply confirmed by the British observers, as well as by Dr. L. MARTIN and Dr. A. PETTIT in the French Army, who demonstrated further that the incubation period in an

[1] The case for the spirochæte as causal agent of infective jaundice is strengthened by a successful attempt of some of the same Japanese investigators, described at p. 192, to apply the principles of passive immunisation to the treatment of the condition.

accidental infection of one of their colleagues was six to eight days. So far, Captain STOKES and his co-workers have not been able to grow the spirochæte outside the body. Some recent observations by the Japanese observers, also confirmed by Captain STOKES, suggest the possibility of the field rat being an agent in the spread of the disease.

Since the outbreak of war the occurrence of toxic jaundice in munition workers has drawn special attention to another form of jaundice, and recently a discussion on this subject has been held at a combined session of the Sections of Medicine, Pathology, and Epidemiology of the Royal Society of Medicine, of which a report appears in the current number of THE LANCET. Toxic jaundice is a well-recognised condition and one form of it—namely, that due to phosphorus poisoning—has been investigated extensively by toxicologists, physiologists, and pathologists. The hæmolytic nature of some cases of toxic jaundice was established by the experiments of STADELMANN and W. HUNTER with toluylene diamine. In 1915 Dr. W. H. WILLCOX and Dr. B. H. SPILSBURY recorded their observations upon an outbreak of toxic jaundice of a new type amongst aeroplane workers.[2] They proved that this condition was due to tetrachlorethane used in a dope or cellulose varnish. Dr. SPILSBURY'S observations upon two fatal cases, and upon the condition experimentally produced in animals, demonstrated that there was a toxic fatty degeneration of the liver, starting in the central zones, then spreading through the lobules, and leading to necrosis. This was followed, if the patient survived sufficiently long, by replacement fibrosis. Fortunately, the occurrence of this condition has now been entirely prevented by appropriate measures and by the use of a safe substitute for tetrachlorethane. A condition of similar character has, however, been observed in some workers with trinitrotoluene. Several of the speakers at the discussion at the Royal Society of Medicine pointed out that the symptoms of poisoning by this substance comprised early cutaneous irritation and dermatitis, toxic gastritis, aplastic anæmia, and toxic jaundice. The blood changes were carefully described by Captain MATTHEW J. STEWART, whose remarks were published in full in last week's issue of THE LANCET. The most striking feature is a neutrophil leucopenia, due, presumably, to a progressive failure of the leucoblastic function of the bone marrow. In one case Captain STEWART found a neutrophil leucocytosis; lymphocytosis was present in many cases, eosinophilia in a few. The changes in the erythrocytes and hæmoglobin were less marked as a rule, but in three cases the anæmia was of the pernicious type. The changes found post mortem in the liver in fatal cases were similar to those previously found by Dr. SPILSBURY in tetrachlorethane poisoning. Captain STEWART describes them as being of a character between a subacute yellow atrophy and an ordinary multilobular cirrhosis of irregular distribution.

In both of these conditions, the spirochætal infection and the trinitrotoluene poisoning, it is important to notice that jaundice is not an essential or invariable symptom. The spirochætal form of jaundice appears to be a true obstructive jaundice due to swelling and partial occlusion of the bile papilla, but both Captain STOKES and his co-workers, as well as Sir BERTRAND DAWSON and Colonel HUME agree that cases of spirochætal infection can occur without jaundice. The latter observers deprecate the use of the term "Weil's Disease" for the spirochætal form of jaundice, since they point out that other forms of infective jaundice occur and that in the disease described by WEIL the infective agent is believed by some authorities to be the *Bacillus proteus fluorescens*. It seems to us that their objection is well founded and the alternative name Spirochætosis icterohæmorrhagica is preferable, in spite of its somewhat cumbrous character. The toxic forms of jaundice here considered seem clearly to belong to the hæmohepatogenous group, and again it is important to remember that poisoning by these toxic substances may occur without jaundice. A recognition of the facts shows that a wider view of both conditions must be taken if satisfactory diagnosis is to be expected, and that too much attention must not be paid to the factor of the jaundice. We can commend the papers to which we have referred to our readers for careful study, since they contain much interesting information and many useful suggestions in regard to diagnosis and treatment.

[2] Med. Soc. Trans., 1915, xxxviii., 129; THE LANCET, 1915, i., 544.

Gunshot Injuries of the Spinal Cord.

IN the Bradshaw Lecture recently delivered before the Royal College of Surgeons of England, and published in THE LANCET of Jan. 20th, Colonel CHARTERS J. SYMONDS, A.M.S., took for his subject the surgical treatment of gunshot injuries of the spinal cord, and dealt in an interesting manner with an important theme. For every surgeon who has had much to do with the treatment of the wounded in the present war has found out the dismal fact that there is no other injury of any organ of the body which approaches gunshot injuries of the spinal cord in the rate of mortality, and this is especially evident when we consider not only the deaths which occur within a short time of the infliction of the injury but especially when we take into account those resulting from complications which may not ensue until weeks or months after the infliction of the injury. The latter aspect of the subject has been fully dealt with by Mr. J. W. THOMSON WALKER in a Hunterian Lecture, delivered before the same College and published in our columns this week. It is a valuable contribution, and contains suggestions for the avoidance of fatal renal infections which command attention.

The injuries which the spinal cord may suffer vary from a mere bruise to complete severance, and the symptoms and treatment will therefore vary in the very greatest degree. It is fairly well established by now that a bullet may cause concussion of the cord with complete paralysis of all the nerves given off below, even though the bullet has never come in contact with the

cord; fortunately, in these cases the rule is that complete recovery follows. The fear of meningitis restrains many surgeons from dealing as freely with injuries of the cord as they otherwise might, but it is strange how little a tendency there is to the production of spinal meningitis, even in cases where suppuration is present and where a puncture in the dura mater exists. There may be a discharge of cerebro-spinal fluid for days or weeks, and yet no meningitis may occur. Only it is essential that there should be good drainage, so that there may be no tension—if the wound be closed or ill-drained meningitis is likely to follow. Therefore the mere presence of sepsis in a wound need not prevent the surgeon removing fragments of bullets or shell from the neighbourhood of the cord, even when the dura mater has been perforated. In such cases an early operation provides for the removal of the foreign body and for thorough drainage of the wound. When, in injury of the spinal cord, it is clear that there is complete loss of continuity of the cord, the wound having healed, any operation to remove fragments of bullets or shells is, as a rule, absolutely useless. There is, however, one exception to this rule, and that is when the pressure of the piece of projectile or displaced bone is causing pain. The relief of pain following operation may sometimes be exceedingly great, and a patient who has needed morphia frequently may be able to dispense with it entirely. But one difficulty presents itself: it is frequently impossible to prove with absolute certainty that there is complete transverse division of the cord, and in a case where there is any doubt it is clearly advisable to operate. When the slightest evidence of continuity of the cord exists an operation is imperative, and the earlier the operation is performed the better for the patient, care being taken to exclude from this rule cases of mere concussion.

Laminectomy being decided upon, the X rays will show the position of any metallic fragments, though, unfortunately, depressed portions of lamina may be quite invisible in the skiagrams, so that we must not trust them implicitly or invariably to supply the actual cause of pressure on the cord. It often happens that at the operation the surgeon finds that a portion of a lamina is obviously exerting pressure on the cord when not a sign of its presence had been afforded by the X rays. An important question arises at this stage, shall the uninjured dura mater be opened? The answer must depend on whether compression of the cord can result from the pressure of a blood-clot within the theca. Some surgeons consider that it may, but Colonel SYMONDS holds the contrary view, and he bases his opinion on the fact that in the cases treated in the South African campaign no such cases were found, and that he has never met with the condition himself. While it can hardly be denied that it may occur, it must be rare. An opening of the dura mater adds, however, little to the danger of a laminectomy, and septic meningitis practically never follows it. When the lesion is situated in the cauda equina the conditions are different, for the nerves there will unite after suture in the same manner as any peripheral nerve; therefore a damaged portion may be excised and the ends brought together with a great expectation that they will unite with a full restoration of function. This certainly cannot be done with the cord itself, though many attempts have been made. Even experiments on the lower animals to suture the spinal cord have all failed. The cord may certainly recover much of its lost function without operation, but no one can doubt that a timely removal of pressure must go far to assist the cord in its recovery.

We may sum up by saying: that in gunshot injuries to the spinal cord an early operation offers the best chance for the patient; that fear of the presence of sepsis need not deter the surgeon from operating; and that not until the surgeon has exposed the spinal dura mater can he speak with any certainty as to the mode in which pressure is being exerted on the cord. It may well be that in the future we shall be able to deal more actively with injuries to the cord, but at present all that the surgeon can do is to relieve pressure and to hope that the cord will be able to recover in part at least from the injury which it has sustained. Experience has shown that in a certain proportion of cases of injuries of the spinal cord much may be done, though in others all the surgical knowledge and skill which we now possess are insufficient to do any good. Workers in this branch of surgery feel that there are many points which can hardly yet be called settled, and Colonel SYMONDS has discussed them most illuminatingly in his lecture.

Annotations.

"Ne quid nimis."

LESS BEER AND MORE BREAD.

No one can quarrel with the conclusion that to-day bread should claim greater respect than beer. The conservation of cereals for food purposes is of the utmost importance and it is absurd to contend seriously that beer forms, or has ever formed, an essential constituent of our food. Bread is a food and beer is a beverage, and these are quite different categories. Few people drink beer because it happens to contain a certain proportion of nutritives in the form of malt sugar, dextrin, and some proteins; it is appreciated as a pleasant, and, in the majority of cases, wholesome drink, and these qualities have made it the national beverage. But although beer does not contain a large amount of nutrient material, there is good reason for saying that in the healthy individual it favours the assimilation of food in a manner akin to such condimental substances as pepper, salt, and vinegar. Beer certainly contains, amongst other things, the vitamines in a remarkable amount, as might be expected having regard to the chemistry and physiology of its raw materials and the method of its production. There is, therefore, little question that beer increases assimilative power, thus adding to the nutrient value of the foods partaken with it. In spite of these considerations the increased output of bread at the expense of beer materials is clearly a sound policy when a shortage of food

supply is to be avoided. Bread and water in reasonable quantities will sustain life; the equivalent in beer would be an inconvenient bulk of material, and, besides, would introduce more alcohol than would be good for the consumer. Thus a pint of beer of moderate strength would, broadly, be equal in food value to 1½ ounces of bread; a pint of light beer would be worth about half this in nutritive value. So we may dismiss any suggestion that beer is a material food, for assuming, at a low estimate, that the daily consumption of bread is half a pound only, the equivalent of this, as regards nutritive value, would be 8 pints of ordinary beer, and a larger measure of light beer. This comparison renders the claims for beer as a direct and economic food material inadmissible, and shows how sound is the action of the Food Controller in further restricting the output of beer so as to husband the supply of grain for direct food purposes. The good sense of a similar restriction in regard to the output of spirits made from farinaceous products is obvious, though exception can be made in the case of wines which are made from the grape. The grape, unlike grain or the potato, is a perishable article, and its conversion into wine would not cause any interference with the supply of food. Brandy disappears automatically with the call upon wine for the use of the troops in France, and its rapidly advancing price will soon become prohibitive to purchase, in which case any restrictive order might well be superfluous.

THE PRESCRIBING OF COCAINE.

WE learn that it has been brought to the notice of the Home Secretary that the requirements of the Defence of the Realm Regulation 40B concerning prescriptions containing cocaine are not being fully carried out by all medical practitioners. A warning has therefore been issued from the Home Office stating that it is obligatory on every practitioner, when giving such a prescription, to date and sign it with his full name and address and qualifications; to mark it with the words "Not to be repeated"; and (except where the medicine to be supplied is a proprietary medicine, in which case it is sufficient to state the amount of the medicine) to specify the total amount of cocaine to be supplied. Failure to comply in any respect with these requirements is an offence against the Regulation which is punishable summarily, and pharmaceutical chemists are forbidden to dispense cocaine on any prescription which is not in compliance with the requirements.

AN AMERICAN OPINION ON BIRTH CONTROL.

Dr. T. D. Crothers, who read a paper recently before the Medico-Legal Society of New York upon the subject of birth control, that is to say, of the prevention of child-production by unsuitable parents, is an uncompromising advocate of State-exercised compulsion in such matters. The object sought is one which all will admit to be desirable, but whether the means necessary to attain it with anything approaching to certainty will ever commend themselves to the public in our own country is another matter. It is enough to say that appeals to potential parents of the undesirable class are not likely to produce any general results, and that it may be rash to prophesy what future generations will consider expedient. In the United States, as in European countries, it is observed that the fewest births are found in the families best able to support and bring up children. On the other hand, in families where conditions of heredity and environment are most adverse the largest numbers of births are found. In these circumstances Dr. Crothers recommends the compulsory sterilisation of criminals, idiots, epileptics, inebriates, and drug-takers, the destruction at birth of abnormal or defective children, and he would "hold the parents responsible and make it the highest crime to attempt to give birth to defective children." The last-mentioned offence appears to be rather obscurely defined in the summary before us, but the intention is fairly clear. Dr. Crothers cites, as an illustration of the spirit in which he would legislate, an old Chinese custom, which consisted in fining the parents of an assassin as well as executing the criminal, the parents themselves being put to death if a second of their children committed a similar offence.

THE SERUM TREATMENT OF SPIROCHÆTOSIS.

AT the time of their discovery of the spirochæte of Weil's disease Professors Inada and Ido claim also to have found in the blood of convalescing guinea-pigs immune substances which dissolved and killed the spirochæte. Ido was shortly afterwards able to demonstrate a remarkably potent effect of the serum of immunised goats upon the disease in the guinea-pig. If injected before jaundice appeared the attack was in every case cut short. Salvarsan had, contrary to expectations, exerted very little effect on the disease in man, and the Japanese observers proceeded to carry out investigations on the value of serum treatment in patients, the results of which are set out in a paper signed by Inada, Ido, Hoki, Ito, and Wani in the *Correspondenz-Blatt für Schweizer Ärzte* of Jan. 20th. The serum first used was that of human convalescents, later that of horses ultimately immunised to tolerate an injection of 800 c.c. of a pure culture of spirochætes containing 30 organisms to the microscopic field (1/12 oil immersion, ocular 3). But serum of this extreme potency could not be obtained for the treatment of patients as it was not prepared until cases of the disease were no longer available. Thirty-five patients were treated, 23 in hospital and 12 in a coal-mine. At first 10 c.c. of serum were injected on each of three successive days, but this dose was soon found to be insufficient, and finally 60 c.c. were given within 24 hours in divided doses intravenously without any harm resulting from sudden lysis of the spirochætes. In 24 cases jaundice was present before serum treatment was begun. The authors employ five criteria to judge of the result of treatment: (1) The death-rate of 23 cases serum-treated in hospital was 17 per cent., compared with 31 per cent. in the cases treated without serum during the previous year; (2) with slight exception 40–60 c.c. of serum were sufficient to kill within 6 to 24 hours the spirochætes in the circulating blood, tested by injecting a sample into a guinea-pig; (3) immune bodies in the patient's blood reached their full development on the average two days earlier in serum-treated cases than in others; (4) in fatal serum-treated cases the spirochætes were less abundant than in untreated cases and showed distinct signs of degeneration; (5) no definite effect on fever, jaundice, or hæmorrhagic tendency was noted in the serum-treated cases. The authors

make no comment on these results except to suggest that Weil's disease, although a spirochætal infection, offers a suitable field for serum treatment, inasmuch as true relapse never occurs, immune bodies develop in the blood in the course of the disease, and this serum immunity, when it has developed, persists long after recovery, in one case up to eight years. Both their results and the proper reserve of their conclusions merit attention.

CLIMATE AND HEALTH.

IN the recent Gresham Lectures on Physic, which, in the absence of Colonel F. M. Sandwith, A.M.S., in Egypt, have been delivered by Dr. Harry Campbell, the lecturer chose as his subject the Influences of Climate on Health. He pointed out that each race and sub-race tends by natural selection to become adapted to the particular region of the earth which it has inhabited through numerous generations, so that, speaking broadly, the climate in which any given individual thrives best is that to which his ancestors have been long accustomed. Man has spread more widely over the earth than any other creature and is able to thrive under the most varied climatic conditions—tropical, Arctic, temperate, mountainous, marine, and the rest—but this, though true of the human race at large, is not true of the individual human. Although he exhibits greater climatic adaptability than any other animal, his power in this respect is nevertheless limited; the negro, for instance, cannot thrive in the Arctic zone any more than the Esquimo can in the tropical zone, the fact being that the various races of mankind—black, white, yellow, and their subdivisions—have by a long process of natural selection become adapted to their own special regions. If a race migrates far north or south of its native zone it tends to die out, and can only become adapted to the new zone by a process of gradual evolution. From this we are asked to believe that the fear entertained by some nations of a black or a yellow domination is groundless, since the various races are, from the nature of things, compelled to remain within definite confines. We must further conclude that in the gradual process of time definite types will evolve in Australia, New Zealand, and other of our colonies, as well as in the United States of America. This influence of climate in evolving racial types is of profound interest. The blonde race, as Dr. Woodruff has forcibly argued, had its origin in the cold, cloudy north-west region of Europe, where a plentiful supply of cutaneous pigment is not necessary in order to protect the body from the actinic rays of the sun, and where a white skin acts beneficially by favouring the retention of the body-heat, on the same principle that a bright teapot retains the heat longer than a black kettle. This fair race having evolved under the most rigorous conditions, of all races displays the most energetic disposition. It is, indeed, the dominating race of the world. Successive swarms of blondes have for thousands of years past migrated southwards and eastwards, and took a large part in founding the civilisations of Greece and Rome, as well as of Egypt and India. Owing, however, to their inability to survive in a latitude far south of their native zone they have gradually been eliminated and thus left no descendants. Dr. Campbell adduced the remarkable fact, as showing the dominating influence of the blonde type, that all the Presidents of the United States of America have had blue eyes, and stated the same to be true of the leading generals in the present war—French, Haig, Joffre, Hindenburg, and Mackensen. The great Napoleon, though a Corsican, had grey eyes. Nothing better shows the influence of climate on racial type than the fact that in all countries the complexion darkens with diminution of latitude. Even after so short a period as 13 generations the inhabitants of the Southern States of America are darker than those of the Northern States. In process of time the blonde type will die out in the United States. We are apt to forget that the most northern of them are south of Penzance. Such considerations emphasise the truth that the climate of our ancestors is the one to which we are racially adapted—the one in which we are most likely to enjoy the best health. This principle applies not only to large sections of mankind but even, it may be, to small sections, such as the inhabitants of the various countries of the British Isles. Dr. J. S. Mackintosh has recently insisted upon this point,[1] urging that due regard should be paid to it in any scheme for settling soldiers on the land after the war.

HISTOLOGICAL CHANGES IN THE SPINAL CORD FOLLOWING BULLET WOUNDS.

Dr. Aubrey Mussen, assistant in psychiatry, Johns Hopkins Hospital, acting neuropathologist under the Medical Research Committee, London, has published in the October number of the *Review of Neurology and Psychiatry* the results of an investigation into the finer histological changes produced in the cord by direct injury or by concussion of the vertebral column. His material comprised bullet injuries of the brain, with secondary effects on the spinal cord; bullet wounds involving the cord directly; and bullets imbedded in the body of a vertebra without direct injury to the spinal medulla. In a case where the patient lived ten hours after a frontal lobe injury from a hand grenade, there was distinct evidence in certain areas of the spinal cord of bends, twists, and swellings on the axis-cylinders. In a second case, the duration of life after a transverse lesion of the cord at the first dorsal segment being 24 hours, axis-cylinders in the cord showed twists, kinks, and loop formations, and often short, sharp waves, as though from the shock of the concussion. Dr. Mussen has a series of four cases where death occurred 10, 24, 48, and 60 hours respectively after the injury, from an examination of which it is certain that marked degeneration has set in, even in the earliest. These are direct or traumatic degenerations, and are not comparable to what are usually termed secondary degenerations. It is rare to get the opportunity of examining such cases in civil life, and when they are seen, only ordinary secondary degenerations are found, as a rule. But in injuries due to bullet wounds the concussion caused by the impact of the bullet, which at 200 yards would strike a terrific blow in 1/50,000th of a second, produces a commotio the effects of which are transmitted through the dura to the spinal fluid, ligaments, pia mater, and septa into the cord substance, hence lacerations, hæmorrhages, and injuries to the neurones, and this, too, in regions many segments removed

[1] THE LANCET, 1916, i., 1189

from the seat of the injury. Dr. Mussen quotes an interesting letter from the Shooting Editor of the *Field*, in regard to the striking force of the .303 Mark VII. service bullet, weighing 174 grains. At 200 yards its velocity is 2020 feet per second, and its striking energy 1010 foot pounds. Assuming that such a bullet striking the body at that distance is pulled up in three inches by the skin, muscles and spinal column, the resistance offered by the tissues is something like 4000 pounds. This may be regarded as the static pressure of the bullet acting against the tissues. The impact of such a force must produce tremendous disturbances, especially since its shock effects can be transmitted to the spinal fluid, where they set up a hydraulic force which acts radially. Dr. Mussen remarks it would be of value to examine the cord in cases of sudden death from concussion produced by the explosion of a shell without any direct injury whatever. It would appear not improbable that another form of concussion might produce similar disturbances to those so minutely detailed in this useful communication.

ROYAL BRITISH COLLEGE OF NURSING.

THE recent amalgamation of the College of Nursing (Limited) with the Royal British Nurses' Association (Incorporated) is a further stage in the public support accorded to the College. The proposal to found such a College was first publicly made by the Hon. Arthur Stanley, chairman of the Joint Red Cross War Committee, in the form of a letter sent to the heads of hospitals and nursing institutions, with the avowed object of organising the teaching and examining of candidates for the nursing profession. Guiltless in intention, the proposal did not, owing to its manner of presentation, meet with immediate approval by the Central Committee for the State Registration of Nurses, which has for many years past worked unremittingly to further Parliamentary action in the interests of the nursing profession, and with which were affiliated the principal nursing associations of Great Britain and Ireland. Towards the end of last year, however, a series of conferences was arranged between the College and the Central Committee, and, after a large measure of unity had been found, negotiations were finally broken off by the Central Committee owing to certain clauses in the proposed Nurses Registration Bill not being accepted by the College. But in the meantime the membership of the College steadily increased by the enrolment of individual members of nursing associations affiliated to the Central Committee, and, finally, the Scottish Nurses' Association threw in its lot definitely with the College of Nursing, whilst retaining the management of its own affairs by a Scottish Board. The affiliated society with the largest membership is the Royal British Nurses' Association, which has now amalgamated with the College. On the granting of the supplementary charter, for which application has been made, the College of Nursing will be wound up in favour of a new Royal British College of Nursing.

JUVENILE DELINQUENCY.

JUVENILE lawlessness, it is stated in "The Child and the War,"[1] issued under the auspices of the Howard Association, has spread through the country like a plague, and although exact statistics are not yet available, there is already sufficient evidence to show that, taking the large towns as a whole, an increase of over 50 per cent. in cases of larceny by quite young persons has occurred, while charges for assault, wilful damage, and gambling are much more numerous. The environment of the present-day child is abnormal. The lack of parental control owing to the exigencies of war, the darkened streets affording opportunities for lawlessness, the mental atmosphere coloured by martial passions: these are all factors inimical to the welfare of the child, and, as the pamphlet points out, punishment, whatever form it may take, affords no real remedy for the evil. The healthy child possesses an unbounded vitality which must have an outlet, and its deeply rooted instincts need guidance and diversion into proper channels. The Howard Association advises the appointment in every district of a children's joint committee composed of members of the local council and magistracy, with powers to coöpt ministers of religion and other social workers. The idea is an admirable one. The Association suggests, further, the enlargement of the sphere of the probation officer and the coöperation with him of carefully selected women of good education. Adequate play-centres are a necessity if the delinquency problem is to be dealt with in a practical manner, and we are glad to know that the Board of Education proposes to give grants for this purpose. Last summer the Board sanctioned the employment in agriculture of nearly 15,000 boys and girls of school age, roughly, half of them between 13 and 14 years old and the remainder between 11 and 13. Such an outlet for superabundant childish energy has much to commend it at the present time. Unfortunately it leaves untouched the long winter evenings, which are the chief difficulty.

[1] The Child and the War: being Notes on Juvenile Delinquency. By Cecil Leeson. Published for the Howard Association by P. S. King and Son, London. Price 1s. net.

Dr. Edward Coey Bigger, Medical Commissioner of the Local Government Board for Ireland, has been nominated by the King a member of the General Council of Medical Education and Registration of the United Kingdom for Ireland.

THE LANCET, VOL. II., 1916: THE INDEX.

OWING to the continued shortage in the paper-supply the Index and Title-page to the volume of THE LANCET which was completed with the issue of Dec. 30th, 1916, have been printed separately, and copies have been supplied gratis to those subscribers who have, up to Feb. 1st, intimated to us their wish to receive them. Other subscribers will be similarly supplied, so long as the stock remains unexhausted, on application to the Manager, THE LANCET Office, 423, Strand, London, W.C. Such applications should be sent in at once.

THE Hawkmoor Sanatorium for the treatment of tuberculosis near Bovey Tracey, erected at a cost of £14,500 and containing 60 beds, has been formally opened by the Devon county council.

DUBLIN UNIVERSITY ELECTION.—The nomination of candidates for the Parliamentary representation of Dublin University took place on Tuesday last. As already announced, the candidates are Mr. A. W. Samuels, K.C., and Professor Sir Robert H. Woods, M.Ch. Polling began on Wednesday and will continue till next Monday afternoon.

THE CONTROL OF VENEREAL DISEASES.

The City of Aberdeen Scheme.

Dr. Matthew Hay, medical officer of health of the city of Aberdeen, has sent us the draft of a scheme which has been before his Public Health Committee. The scheme has been drawn up in consultation with the county medical officers of Aberdeen, Banff, and Kincardine, and representatives of the medical profession in Aberdeen and the three counties. The Royal Infirmary of Aberdeen is proposed as the treatment centre, without precluding the provision of facilities elsewhere later. Cases in the later stages are to be treated as heretofore in the ordinary wards, and the existing provision of special wards to be extended to about 20 beds. For the out-patient treatment of early and more infectious cases special clinics are proposed, or mixed clinics in association with cases of skin disease, to be held on at least two days and two evenings in the week for both sexes separately. The special medical staff is to include a surgeon and a physician, who will form part of the infirmary staff, the appointments to be provisional during the war. After the close of the war these special officers will be allowed to engage in consulting but not general practice. A junior medical assistant will assist the special staff in the venereal wards and clinics, and also be at the disposal of medical practitioners to advise them in home treatment. The bacteriological services required under the scheme are to be given in the laboratories attached to the infirmary under the general supervision of the chief pathologist. If the approval of the Local Government Board is obtained fees are to be offered to the medical practitioner for procuring blood for Wassermann test (5*s*.) and samples of secretion (2*s*. 6*d*.). The question of the payment of general practitioners for treatment of venereal diseases in private practice is to be held over at present. But nothing is understood to stand in the way of the practitioner being remunerated as usual by patients able and willing to pay for treatment, and in such cases laboratory tests will still be made gratis and possibly salvarsan supplied. Finally, the University is to be asked to take steps to ensure the practical instruction of all medical students in the diagnosis and treatment of venereal diseases.

The City of London Scheme: The Position of the General Practitioner.

In his address last week to the British Hospitals Association on the treatment and control of venereal diseases, with special reference to the voluntary hospital, Dr. W. J. Howarth dwelt in some detail on the scheme for the City of London drawn up by himself as medical officer of health. As we have already stated, an existing hospital in Golden-lane is to be used as the treatment centre, beds being provided there for ordinary routine work. For cases requiring special treatment arrangements will be made for the use of beds at St. Bartholomew's Hospital. The clinic will be provided with waiting-rooms, consultation-room, dispensary, two wards, two operating or special treatment rooms, and a teaching and demonstration-room. Special laboratory work will be carried out under the direction of the hospital pathologist and routine clinical examinations at the centre itself. Residential accommodation for the staff is attached. The whole centre will be under the direct administration of the hospital authorities. The staff, in addition to the nurses and general helpers, will include a member of the honorary staff, who will be in charge, assisted by a whole-time non-resident officer and a resident medical officer who will divide his time between the work of the skin department and that devoted to the treatment of venereal diseases. Assistance by general practitioners is under consideration. Provision is being made for free bacteriological examination of morbid products, the free supply of salvarsan, and for educational and publicity work. The Corporation have suggested as payment a maximum sum of £1800 for the first year, exclusive of the cost of salvarsan or its substitutes. The capital expenditure necessary for the equipment and alterations, estimated at about £1000, will be borne by the Corporation. Dr. Howarth states that quite apart from the City scheme arrangements already have been made at St. Bartholomew's Hospital for putting into practice the early preventive treatment described in our leading article of Jan. 13th. The facilities are only used by soldiers.

Dr Howarth went on to define the position of the general practitioner to the venereal schemes.

"I do not think," he said, "that hospitals are going to attract patients on a higher social scale for this special treatment than they do to-day for other treatment. Possibly, even some of those who attend for free treatment of other diseases, and who could pay their own doctor—there are such attend hospital out-patients' departments—will not seek free treatment for venereal infection. This section of the community will consult their own doctors, if they seek medical advice at all. I express a doubt here, because I fear that the quack, if allowed to flourish, will maintain his position as an active competitor. This should not be, and the hospitals, whilst accepting responsibility for imparting knowledge to practitioners, must assist him to obtain his rightful position by joining in the present agitation in favour of suppressing unqualified treatment and quack advertisements. The interest of the practitioners must be active and not passive. There is too much of the passive tendency in the latest introductions, in which treatment is undertaken at the instance of local authorities. This must inevitably result if special places are established with clinical responsibility limited to a public officer and inadequate encouragement given to the local practitioners. It is an undoubted necessity that medical practitioners shall be actively interested in all public medical work. Where hospitals exist every opportunity should be taken to extend the sphere of usefulness. The establishment of new centres, unless circumstances require it, is a source of weakness, and coincidently with this increased activity the duty of the hospital to the public must not be lost sight of. This duty is closely associated with continuous educational facilities for the medical profession as a whole."

Deputation on Unqualified Practice.

Lord Rhondda, President of the Local Government Board, received on Jan. 24th a deputation urging that unqualified practitioners should be prevented from undertaking the treatment of venereal diseases. The Royal College of Physicians of London, the British Medical Association, and the National Council for Combating Venereal Diseases were represented, as well as the associations of local authorities. The deputation was introduced by Sir Hamar Greenwood, M.P. The Lord Mayor of Birmingham, speaking on behalf of the Association of Municipal Corporations, said that public money should only be spent where there was prospect of the best results, and in order to protect the work of the local authorities quack advertisements should be suppressed and unqualified persons prevented from treating cases. Dr. Frederick Taylor, on behalf of the Royal College of Physicians, said that venereal diseases ought to be treated by those who knew how to do so. Mr. E. B. Turner, speaking as chairman of representative meetings of the British Medical Association, said that the Association had passed strong resolutions on the subject. The medical profession, in seeking to ensure efficient means of treating venereal diseases, was working for the general good of the community. Sir Malcolm Morris expressed the hope that a Bill suppressing quack treatment would be introduced. Lord Rhondda, in reply, said that his department fully realised the burning nature of the question of unqualified practice. He looked upon it as one of the most urgent and important questions to be dealt with in the near future. He had been greatly impressed with the complete agreement on this subject between local authorities and the medical profession, and assured the deputation that legislation would probably be brought in by one of the State departments—probably the Local Government Board—at an early date. Replying later to a vote of thanks, Lord Rhondda added that he was perfectly satisfied that the medical profession were actuated in this question by considerations of State policy and not by self-interest.

Sickness Benefit and the Friendly Societies.

In its final report issued last week on Approved Society finance and administration in connexion with National Health Insurance the Departmental Committee recommends societies to alter their rules so as to enable them to pay benefits in sickness due to venereal diseases, basing its recommendation on the danger to the community of the venereal patient.

Supply of Salvarsan without Formalities.

A recent Order issued under the Defence of the Realm Acts facilitates the distribution of salvarsan and its approved substitutes. During the war the Local Government Board may authorise any local authority or person to

buy and distribute "any drug, medicine, or medicinal preparation specially designed for the treatment of venereal diseases" without incurring any liability to proceedings "in respect of the importation, purchase, sale, distribution, or use thereof on the ground that any patent or other similar rights are infringed."

Public Health.

REPORTS OF SCHOOL MEDICAL OFFICERS.

Bristol ranks sixth among the cities of England and Wales is regard to population, after the metropolis, and has a school roll of 59,372. The report of 1915 is furnished by Dr. Madeleine Baker, in the absence of Dr. R. A. Askins on military service. The number of children examined as entrants, leavers, and in the intermediate group was 15,098. The state of nutrition was found to be "normal" in 83·2, and excellent in 13·3 per cent., only 3·46 per cent. being considered to be below normal, and of these only 0·17 to be actually badly nourished. The cleanliness of the children was also very satisfactory, 98·8 per cent. being returned as clean, and only 0·05 per cent. being found to have body vermin. The children's eyesight was found to be perfect in each eye in 47·5 per cent. of those examined, while an additional 40 per cent. possessed at least 6/9 of normal vision in either right or left eye. Organic heart disease was diagnosed in 1·31 per cent., being considerably more prevalent among girls (2·17 per cent.) than boys (1·04 per cent.) at the leaving age. Tuberculosis of the lungs was found in 0·12 and suspected in 0·55 per cent. of the children; other forms of the disease (glandular and articular) were found in 0·20 per cent. Two school clinics were opened in June, 1915, one in New-street and the other in Bedminster-parade. These clinics are used for the two purposes of inspection and treatment. Inspection clinics are also held at New-street special school and at the Bedminster school for mothers. The treatment clinics deal with children that would otherwise obtain no treatment, especially in regard to affections of the skin, eye and ear. Notifiable infectious diseases were much less prevalent during 1915 than in the previous year, 795 cases as compared with 1745 in 1914, scarlet fever (553 cases) and diphtheria (228) being the most important. Non-notifiable infections were, on the other hand, more prevalent, measles being the chief. No school closure for epidemic disease was required, except for a fortnight in a single school. The chief cause of death among school children was tuberculous disease (46 fatal cases), either of the lungs, the meninges, or in other situations. Pneumonia caused 26 deaths, organic heart disease 18, diphtheria and croup 14, and meningitis (non-tuberculous) 14. Two open-air schools have been at work throughout the year, the larger one at Knowle, with an average attendance of 69, and a smaller one at Barton Hill; anæmia, malnutrition and general delicacy, and tuberculosis contacts have been the cases chiefly treated, and the effects have been most beneficial. The children take a keen interest in gardening, have the advantage of walks in the country, and are ensured a midday rest, as well as the use of a shower-bath.

At *Cardiff* the average school attendance during 1915 was 27,982; the number of children examined in the entrant and leaver groups was 5936. The report is furnished by Dr. Edward Walford, medical officer of health for the city and port. The state of nutrition was found to be normal in 73·1 and excellent in 13·9 per cent.; in 12·7 per cent. it was below normal, and among these in 1·3 per cent. it was classed as distinctly bad. The body cleanliness was satisfactory in 94·7 per cent; in 2·3 per cent. vermin were found to be present. The eyesight was examined in 2918 children of the "leaver" age (12 to 14 years); it was found to be perfect in each eye in 52·9 per cent., and an additional 16 per cent. possessed 6/6 in either right or left eye. Organic disease of the heart was found to be present in 0·72 per cent.; amongst boys the incidence was 0·91 and amongst girls it was 0·52 per cent. Tuberculosis of the lungs was found in 0·06 and suspected in 0·30 per cent., and in a further 0·2 per cent. non-pulmonary tuberculosis was diagnosed. A school clinic has been in operation since 1913 in the basement of the City Hall, where defects of the ear, nose, and throat are treated, and examinations made for defective vision.

In Mr. Joseph Beard's report on *Carlisle* schools special attention is drawn to the erection of a new infants' school at Newtown, which "marks a great advance in the hygienic construction of elementary schools." Classroom accommodation for 400 is provided on a basis of nine square feet per head, with verandahs for teaching and a central play-room in addition. All class-rooms have windows on two sides at least carried up to the ceiling; the corridor windows are removable, so that in summer the corridors may be entirely open to the air. Heating is on the low-pressure hot-water system, the pipes being placed on the north side of the class-rooms and at a high level so as to obviate down draughts. The medical examination has included 2675 entrants, leavers, and 8-year-old children. Their nutrition was found to be normal in 69·3 per cent. and excellent in 12·4 per cent.; in 18·2 per cent. it was below normal, but in only 0·1 per cent. was it considered to be actually bad. Cleanliness of the body was satisfactory in 86·8 per cent., and only 0·6 per cent. were considered to be actually dirty, though 1·3 per cent. in addition were verminous and 3·0 per cent. flea-bitten. Perfect vision was possessed by 68·8 per cent. of the children of "leaver" age. Of the children in the leaver and intermediate groups 97 per cent. had perfect hearing, as shown by the whisper at 20 feet. Organic heart disease was found in 1·3 per cent. of the total number of children, being nearly twice as frequent among boys as among girls. This disparity resulted entirely from the preponderance in boy entrants (503), in 11 of whom organic heart disease was diagnosed, while in a nearly equal number of girls (483) only one such case was found. Tuberculosis of the lungs was found in 1·3 and suspected in 8·4 per cent.; other forms of tubercle were diagnosed in an additional 1 per cent.

Dr. W. G. Willoughby, in presenting the report to the education authority of *Eastbourne*, states that Dr. Norah Smith has been practically school medical officer during the year 1915 on account of his own service in the Army, and draws attention to the fact that there is again a decrease in the number of children attending the elementary schools, due to the rapidly diminishing birth-rate; in five years this decrease has amounted to 153. The total number of children inspected at the routine age-periods (entrants, intermediates, and leavers) was 1902. Of these, 25·5 per cent. were found to be in an excellent condition as regards nutrition, 52·3 were normal, and 22·2 below normal, 8·3 being actually badly nourished. As regards cleanliness, 89·3 are returned as clean, only 1·5 per cent. being considered to be dirty; in addition pediculosis was found in 1·2 per cent., and 8·1 per cent. are returned as "P.I." The vision was perfect in each eye in 80·9 per cent. of the leavers and intermediate group. Organic disease of the heart was diagnosed in 0·9 per cent., being much more prevalent amongst girls (1·31) than boys (0·51 per cent.). Tuberculosis of the lungs was found in 0·1 and suspected in 0·2 per cent. of the children examined. Non-pulmonary tuberculosis (glandular) was found in an additional 0·3 per cent. A clinic has been established for minor ailments (chiefly ear, eye, and skin defects), where the children attend each whole school day at 10 A.M. It had been found that their attendance at intervals and the issue of ointment, lotion, &c., for use at home was unsatisfactory, as the parents did not follow the instructions given.

The report on school medical inspection at *Newark* for 1915 is a short one, as Dr. S. Nicol Galbraith was appointed only at the beginning of November, there having been an interim without a school medical officer since May 31st, when Dr. E. A. B. Poole ceased to act. The number of children examined at the routine ages was 510; of these, 30 per cent. were "excellent" as regards nutrition, 14·5 were regarded as below normal, only 0·8 per cent. (4 children) as actually badly nourished, and the rest were classed as normal. Cleanliness was quite satisfactory in 97·5 per cent. Vision was perfect in each eye in 81·5 per cent. of the leavers and children of intermediate age; in only 8·6 per cent. was visual acuity less than 6/9 of the normal. Organic heart disease was diagnosed in 1·17 per cent. (4 girls and 2 boys), and tuberculosis (glandular) was diagnosed in 2 children and suspected (pulmonary) in 5 others.

In the report on school hygiene at *Warrington* Dr. G. W. N. Joseph draws attention to the fact (perhaps not always fully

realised) that "whatever the necessity for carrying on the work of the School Medical Service was in the days before the war, the present abnormal conditions greatly intensify it.....It is more than ever essential that a generation of healthy children should be growing up." This is seen on examining the statistics of the causes for rejection of recruits, many of the defects being preventable or remediable if taken in time. The total number of children examined in the code groups was 3786: an almost equal number (3655) were inspected at the school clinic, being "special" cases, chiefly of impetigo, ringworm, pediculosis, and conjunctivitis and blepharitis. Of the code-group children the nutrition was considered to be above normal in 7·6, and normal in 83·7 per cent., only 8·6 per cent. being below normal and 0·2 per cent. markedly defective. Cleanliness both of the body and head was satisfactory in 99·8 per cent. In the intermediate and leaver groups 33·7 per cent. had perfect vision, and 31·5 per cent. had V. = 6/9 in each eye. Children able to read 6/12 are not dealt with unless there are other symptoms of visual defect; if only 6/18 can be read, the parents are asked to consult their doctor, but the matter is not pressed further; if there is any difficulty in reading 6/18 the parents are pressed, as far as it is possible, to obtain treatment. This procedure is more indulgent to the short-sighted than the usual practice. Organic disease of the heart was found in only 6 children (0·1 per cent.), 5 of whom were girls. Tuberculosis of the lungs was diagnosed in only one child and suspected in another; other forms of the disease (joints, glands, &c.) were found in five children. The work of the treatment clinic has increased enormously, the number of children dealt with having been nearly double, and the number of attendances more than double, the corresponding figures for 1914. Pediculosis of the scalp does not now receive treatment at the clinic. This was found to encourage laziness in the parent, to take up too much time, and to be a bad example to the other children. The proper procedure is explained to the parent by the school nurse (vinegar and water and a fine-tooth comb), and if rapid improvement does not follow it is advised that the hair be cut short. The great cause of failure is the use of too cheap, and therefore too coarse, a comb. Dr. Joseph notes that there is still a prevalent belief that "nits in the hair are a sign of good health in the child."

In the city of *York* the total number of children in the entrant and leaver groups inspected amounted to 1586; none of the "intermediate" age were examined. The nutrition was found to be normal in 73·5 and excellent in 14·8 per cent.; 11·7 per cent. were below normal, but none were actually badly nourished. Cleanliness of the body was satisfactory in 89·5 per cent., the remaining 10·5 being dirty, but in only 0·3 per cent. were pediculi found. The vision (of the elder children) was perfect in each eye in 46·9 per cent.; in 35·3 per cent. there was "less than 6/6, but not less than 6/9 in one or both eyes"; (presumably less than 6/6 in one or both, but not less than 6/9 in *each* eye); in 17·8 per cent. there was less than 6/9 "in one or both eyes." Perfect hearing was possessed by 97·8 per cent. of the children. Organic heart disease was found in 20 children (1·2 per cent.), of whom 6 were boys and 14 were girls. Tuberculosis of the lungs was not diagnosed in a single instance, and in only three children was it suspected; non-pulmonary tuberculosis was found in two children only—these are the figures given in Table II. referring to the age-group children examined. There were, however, 53 cases of tuberculosis notified during the year among children of from 5 to 15 years of age, 20 being pulmonary and 33 glandular, articular, &c.; this equals 0·45 per cent. of the school population. Dr. E. M. Smith's report is followed by a valuable study of the condition of the teeth in 10,000 York children by Mr. T. E. Constant, dental surgeon to the York clinic.

URBAN VITAL STATISTICS.

(Week ended Jan. 27th, 1917.)

English and Welsh Towns.—In the 96 English and Welsh towns, with an aggregate population estimated at nearly 18,000,000 persons, the annual rate of mortality during the week was equal to 17·0, against rates steadily declining from 23·7 to 16·2 per 1000 in the five preceding weeks. In London, with a population of more than 4,000,000, the death-rate was 18·4, or 1·9 per 1000 above that in the previous week; while among the remaining towns it ranged from 6·0 in Enfield, 8·1 in Acton, and 8·7 in Ealing, to 24·3 in St. Helens, 26·0 in Ipswich, and 28·2 in Bournemouth. The principal epidemic diseases caused 193 deaths, corresponding to an annual rate of 0·6 per 1000, and included 70 from measles, 53 from infantile diarrhœa, 38 from diphtheria, 18 from whooping-cough, 8 from scarlet fever, and 6 from enteric fever. The deaths from measles were slightly in excess of the average in the three preceding weeks, and caused a death-rate of 1·5 in East Ham and of 3·7 in Wimbledon. The 811 cases of scarlet fever under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital were 1 less, and the 1390 cases of diphtheria were 6 less than at the end of the previous week. Of the 5636 deaths from all causes in the 96 towns, 230 resulted from violence; the causes of 62 of the total deaths were uncertified, of which 10 were registered in Birmingham, 10 in Liverpool, and 5 in South Shields, but only 1 in London.

Scotch Towns.—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2,500,000 persons, the annual death rate was equal to 16·9, against rates declining from 19·6 to 17·6 per 1000 in the five preceding weeks. The 356 deaths registered in Glasgow corresponded to an annual rate of 16·6, were equal to the number recorded in the previous week, and included 6 from whooping-cough, 5 each from measles and diphtheria, and 1 each from scarlet fever and infantile diarrhœa. In Edinburgh the 103 deaths were equal to an annual rate of 16·2 per 1000, and included a fatal case of whooping-cough and 1 of diphtheria.

Irish Towns.—The 174 deaths in Dublin were equal to an annual rate of 22·7, or 1·7 per 1000 below that recorded in the previous week, and included 3 each from measles and infantile diarrhœa and 1 each from whooping cough and diphtheria. The causes of 8 of the total deaths were uncertified. In Belfast 169 deaths were registered during the week, and corresponded to an annual rate of 22·4, or 2·9 per 1000 above the rate recorded in the previous week; 3 deaths were referred to measles, 3 to infantile diarrhœa, and 1 to whooping-cough.

THE SERVICES.

ROYAL NAVAL MEDICAL SERVICE.

To be temporary Surgeons: E. S. Orme, G. Hoffmeister, A. F. Grimbly.

ARMY MEDICAL SERVICE.

Lieutenant-Colonels to be acting Colonels whilst employed as Assistant Directors of Medical Services of a Division: G. W. Tate, F. E. Gunter.

ROYAL ARMY MEDICAL CORPS.

Lieut.-Col. E. Brodribb is placed on the half-pay list on account of ill-health.

Majors (acting Lieutenant-Colonels) relinquishing their acting rank on reposting: W. J. P. Adye-Curran, A. S. Arthur.

Major D. O. Hyde, D.S.O., to be acting Lieutenant-Colonel whilst in command of a Field Ambulance.

Major T. P. Bradley, Canadian A.M.C. (Canadian Militia), to be temporary Major.

To be temporary Captains: F. H. Knaggs (whilst employed at the Huddersfield War Hospital), Temp. Lieut. E. P. Evans, J. L. Aymard, P. S. Blaker (late Capt., I.M.S.) H. Dodgson, L. M. Scott, C. R. Skyrme (late Surg.-Capt., R.G.A. (Vols.)).

Captains, from R.A.M.C. Special Reserve, to be Lieutenants, and granted the rank of temporary Captain: W. L. E. Reynolds, H. R. Sheppard.

To be temporary Lieutenants: D. N. Knox, T. Y. Finlay, J. H. Kay, J. C. Henderson, E. Miskin, M. R. Lawrence, Temp. Hon. Capt. H. Deardon, J. Dundon, C. C. Gibson, B. H. Woodyatt, T. J. Taunton, A. E. Woodall, A. Y. Hutchison, J. Gardner, E. O'Reilly, T. E. Regan, J. D. Laidlaw, T. Burrell, W. E. Barrett, D. A. H. Moses, A. C. Parsons, F. B. Elwood, J. G. Heath, J. R. O'Brien, R. L. Rea, W. F. H. Ives, A. P. Thom, E. C. B. Ibotson, J. W. Lindsay, J. Hogg, J. B. Howell, J. S. Doyle, R. L. Jones, R. Roberts, A. M. Crawford, T. J. McDonald, W. T. Hardie, T. H. Campbell, J. F. Wood, F. C. Stewart, J. Harper, R. F. Sedgwick, G. R. Rew, N. Flower, R. G. Cunningham, W. M. McFarlane, A. F. W. Millar, A. G. Holms, W. A. Murray.

To be temporary Honorary Lieutenant: N. Sherrard.

Officers relinquishing their commissions: Temp. Major P. MacGregor (on account of ill-health), Temp. Hon. Major T. C. L. Jones (having ceased to be employed with No. 6 British Red Cross (Liverpool Merchants' Mobile) Hospital), Temp. Capts. A. E. Lyster, C. H. Shearman, S. H. Ormond, O. H. Edwards, J. E. Stacey (on account of ill-health), Temp. Lieuts. W. Thomson (on account of ill-health), H. A. Hutt, P. W. Barker, R. T. Jupp (on account of ill-health).

SPECIAL RESERVE OF OFFICERS.

Capt. (temp. Major) R. M. Beath relinquishes his temporary rank on ceasing to command Troops on a Hospital Ship.

To be Captains: W. S. Dawson, G. Perkins, J. N. L. Blamey, R. L. Newell.

To be Lieutenants: W. Garde-Browne, E. ffolliott Creed (from University of London Contingent, O.T.C.).

TERRITORIAL FORCE.

To be Captains: Capt. A. Rodger (from a Mounted Brigade Field Ambulance), Capt. H. E. S. Richards (from Attached to Units other than Medical Units), Lieut. E. B. C. Mayrs, Lieut. W. F. Lanchester, Lieut. T. Higson, Lieut. A. Iredale.

To be Lieutenant: J. D. Davidson.

TERRITORIAL FORCE RESERVE.

To be Captain: Capt. F. G. Bennett, from a Field Ambulance.

HART HOUSE V.A.D. HOSPITAL, BURNHAM, SOMERSET.—A new wing and other additions have been added to this hospital and the accommodation increased by 50 beds. The institution now contains 120 beds.

HOSPITAL SUNDAY AT PLYMOUTH.—The South Devon and East Cornwall Hospital has received £562 as the result of the observance of Oct. 2nd, 1916, as Hospital Sunday at Plymouth.

Correspondence.

"Audi alteram partem."

THE PHENOMENA OF ANAPHYLAXIS.

To the Editor of THE LANCET.

SIR,—In connexion with Captain S. Wyard's paper in your issue of Jan. 20th, and the references to the same subject in your leading article, the following cases seem worth recording. They appear hard to reconcile with many of our present ideas concerning the mechanism of anaphylaxis, especially as regards the minimal toxogenic dose and the desensitising effect of subminimal doses of antigen, recorded by Besredka, and advocated by him as affording efficient protection when administering antisera to patients suspected of previous sensitisation.

For certain reasons, which have no bearing on the point in question, the effect was tried of administering repeated small doses of antistreptococcal serum in a series of cases of streptococcal infections of varying acuteness. In some few cases an autogenous vaccine was administered concurrently with the serum. In the majority of these latter cases serum and vaccine were administered at the same time, sometimes separately and at different sites, in some cases together. When given together the serum and vaccine were mixed in the syringe immediately before injection. In all, some 28 cases were treated on these lines, and of these four developed acute anaphylactic symptoms. In one case two separate attacks were precipitated.

The essential details are as follows:—

CASE 1.—Severe streptococcal infection, originating in a traumatic injury to the wrist, with subsequent metastatic abscesses in the leg.

Injections of Serum and Vaccine.

	Antistreptococcal serum.	Antistreptococcal serum		Vaccine.
9/3/16 A.M.	2 c.c.	21/3/16 ... 2 c.c. ...	...	—
P.M.	2 c.c.	22/3/16 ... 2 c.c. ...	...	—
10/3/16 A.M.	2 c.c.	23/3/16 ... 2 c.c.	+	10 mil. streptococci.
P.M.	1·5 c.c.	25/3/16 ... 2 c.c.	+	20 mil. ,,
11/3/16	2 c.c.	27/3/16 ... 0·25 c.c.	+	25 mil. ,,
12/3/16	2 c.c.	29/3/16 ... 0·25 c.c.	+	25 mil. ,,
14/3/16	2 c.c.	31/3/16 ... 0·5 c.c.	+	40 mil. ,,
15/3/16	2 c.c.	3/4/16 ... 0·5 c.c.	+	50 mil. ,,
16/3/16	2 c.c.	5/4/16 ... 0·5 c.c.	+	100 mil. ,,
17/3/15	1 c.c.	7/4/16 ... 0·6 c.c.	+	200 mil. ,,
20/3/16	2 c.c.	10/4/16 ... 1·5 c.c.	+	2·0 mil. ,,

(Immediate anaphylaxis.)

In addition to these injections of serum the wound in the hand, and later the two small cavities in the leg, were dressed daily with diluted antistreptococcal serum (1/10 in normal saline), about 10 c.c. of the saline dilution being used at each dressing. On 14/3/16, and on most succeeding days 1 to 2 c.c. of pure serum was applied to the wound before the fresh dressing was put on. On no occasion were more than 6 c.c. of serum given in one day, including the actual injection and the amount used as a dressing for the wounds, and on the great majority of days the total amount varied between 2 and 4 c.c. The majority of the injections, including that which was followed by the anaphylactic attack, were given subcutaneously; a few were administered intramuscularly, none intravenously. No history could be obtained of any previous injection of serum.

CASE 2.—Streptococcal infection of wounds of leg.

Injections of Serum.

	Antistreptococcal serum.		Antistreptococcal serum.
18/7/16	2 c.c.	22/7/16	2 c.c.
19/7/16	1 c.c.	27/7/16	2 c.c.
21/7/16	2 c.c.	28/7/16	1 c.c.

(Immediate anaphylaxis.)

There were two small surface wounds and one long superficial sinus, open at both ends. These were irrigated daily with a 1/10 dilution of serum in saline, about 10 c.c. of the fluid being used on each occasion. All the serum injections were given intramuscularly in the immediate neighbourhood of one of the wounds. The infection in this case originated in a gunshot wound, and there was a probable injection of antitetanic serum about the end of the first week of April, 1916.

CASE 3.—Streptococcal infection of gunshot wound of buttock.

Injections of Serum.

	Antistreptococcal serum.		Antistreptococcal serum.
27/7/16...	2·5 c.c.	31/7/16...	2·5 c.c.
28/7/16...	2 c.c.		

(Immediate anaphylaxis.)

The injections were given intramuscularly in the immediate neighbourhood of the wound. From 17/7/16 to 31/7/16 the wound cavity, which was at first large but rapidly decreased in size, was washed out with 10 c.c. of a 1/10 dilution of serum, as in the above cases. On 18/7/16, 10 c.c. of undiluted serum were injected into the wound cavity, but very little was retained in it, the greater part returning at once. This patient was wounded on July 1st, and received an injection of antitetanic serum before being evacuated to England.

CASE 4.—This was an acute streptococcal infection of the hand and arm, following trauma. The full notes of this case are not available at the present moment, but it was essentially similar to Case 1, with one important exception. Within a few days of admission the patient received three injections, each of 10 c.c., of antistreptococcal serum; these were without effect. He was then treated for three weeks with a streptococcal vaccine, also without effect. Small daily injections of serum were then commenced, combined with intermittent irrigation of the wound with diluted serum as above, and an immediate beneficial result was observed. After about 14 days of this treatment he suddenly had a sharp anaphylactic reaction following the injection of 2 c.c. of serum. This was the first case in which such a reaction occurred, and as it was thought that the patient had probably been desensitised, the injections were continued. About 14 days later another similar reaction occurred and no further serum injections were given. 2 c.c. was the largest amount administered at any one injection, and on several occasions 1 c.c. only was given. The injections were given subcutaneously and intramuscularly.

The symptoms were strikingly similar in all four cases. They started immediately after the injections had been given, in one case before the needle had been withdrawn, and in every case within a few minutes. Difficult and laboured respiration was a marked feature in each case. Marked cyanosis was present in two cases, while in the other two this was replaced by intense congestion and redness of the face, followed by profuse perspiration, which developed rather later in the two cases which showed cyanosis. In all cases pain was complained of: in three instances localised in the back, or back and side, in one in the abdomen. Each patient complained of a feeling of acute distress which he was quite unable to describe. In two of the cases, in which there was only a slight irregularity of temperature at the time of the attack, a slight pyrexial reaction followed, the temperature rising to about 100° F. on the same evening and then rapidly subsiding. The other two cases were suffering from definite pyrexia ranging from 99° to 102° at the time when the anaphylactic reaction occurred. Of these, Case 4 on each occasion showed only a slight exacerbation of fever, while with Case 1 the temperature rose the same night to 105·2, but then rapidly subsided. In each case the acute symptoms lasted for 5 to 15 minutes, but with one exception there was definite discomfort and malaise lasting for some hours. All four patients had completely recovered from the attack by the following morning, and they all subsequently made a complete recovery from their infections. No acute local manifestation occurred with these attacks, but one of the four cases and several of the other 24 treated on these lines exhibited transitory joint pains and urticarial rashes during the course of the infection.

It would seem difficult to offer any satisfactory explanation of these facts. Case 1 had apparently never received a previous and possibly sensitising dose of serum. Of the others, Cases 2 and 3 had received at most a few c.c. of antitetanic serum on one occasion. Case 4 alone had received a previous dose of any size. In this connexion it may be recalled that Hoblobut, dealing with bacterial anaphylaxis, demonstrated that sensitisation was more surely attained by repeated small doses of antigen than by a single large dose. The very small doses which actually gave rise to the anaphylactic attack are remarkable. The conclusion can, I think, hardly be avoided that we are dealing with a cumulative effect, an idea which is rendered more probable by our knowledge of the persistence of an antigen in the tissues after injection. Adopting this hypothesis, it might be supposed that a delicate state of equilibrium had been established between the antigen and antibody already in the tissues, and that the sudden addition of even a minute excess of the former sufficed to destroy this balance and precipitate the reaction which leads to anaphylactic shock. Such a suggestion is, of course, entirely lacking in satisfactory experimental support and presents certain obvious difficulties, but it is hard to find any explanation which will cover the facts without running contrary to many of the current theories.

The important practical point is that it would seem quite impossible to reconcile these cases with a trust in the

efficient production of desensitisation by a small initial dose of serum. In this connexion, if I recollect aright, Professor Andrewes in a paper on Cerebro-Spinal Meningitis, communicated last year to the Pathological Section of the Royal Society of Medicine, noted that in one case in which an attempt was made to desensitise a patient by a small preliminary injection of antimeningococcal serum, acute anaphylaxis resulted when the subsequent therapeutic dose was administered.—I am, Sir, yours faithfully,

W. W. C. TOPLEY.

Bacteriological Department, Charing Cross Hospital, Jan. 20th, 1917.

To the Editor of THE LANCET.

SIR,—In the papers referring to anaphylaxis which have lately been published, it is a pity that most of the results given in them are in so vague and indefinite a form. Perhaps it is yet too early to expect much else. One would like to see numerical records of the total number of serum-treated cases seen by each observer, the number of cases in which anaphylaxis occurred, the amount of serum, the mode of administration, and the number of doses given. Also records of the severity of the anaphylactic attack, the time of onset, and the duration and the treatment adopted. Only thus will it be possible later to make trustworthy deductions. This is evident because in a few instances where definite figures are given they are obviously inaccurate. For example, in Captain S. Wyard's paper in THE LANCET of Jan. 20th it is stated that about 4–5 c.c. of serum are required to produce an anaphylactic attack in a sensitised guinea pig, and that "antigen administered by the mouth or rectum never produces anaphylactic shock," whereas the truth is that as many minims given subcutaneously will often suffice in the guinea-pig, and in man I have seen and described a case in which 0·5 c.c. given *by the mouth* produced slight symptoms on two occasions in a man who had previously nearly died of anaphylaxis. Again, there may be something special about antitetanic serum to justify the assertion of the Committee of the War Office (quoted by Sir D. Bruce) that the danger of anaphylactic shock is negligible with 3 c.c. of horse serum after a preceding injection; but one would very much like to know whether there have not been any anaphylactic accidents as a result, not to mention fatalities. Of course, even if there have been, it does not follow that the risk is not justifiable: but the risk should not be concealed or ignored.

I am, Sir, yours faithfully,

University of Leeds, Jan. 29th, 1917. A. S. LEYTON.

DEFINITION OF ACUTE ALCOHOLISM.

To the Editor of THE LANCET.

SIR,—From Dr. Chalmers Watson's letter in your issue of Jan. 27th it is apparently to be inferred that the records of the Edinburgh Royal Infirmary do not enable a distinction to be made between cases of delirium tremens and other less definite alcoholic conditions. This is unfortunate, and must tend, I fear, to make Dr. Watson's statistics less impressive than they might otherwise be. For it is obvious that an increase in the number of cases of delirium tremens would have an evidential value which cannot possibly attach to an increase in the number of cases of "acute alcoholism"—a category of vague and elastic limits which may quite probably include patients who were merely so "drunk and incapable" that an unusually sympathetic or inexperienced policeman would prefer to take them to the hospital rather than to the cells. And in this connexion it may be recalled that these cases, as Dr. Watson tells us, were "nearly all brought in by the police," and, no doubt, the Edinburgh police, like the police of other towns, have been freely diluted with special constables during the past year. Under these circumstances, it must remain a matter of some uncertainty by what precise criteria we are to distinguish the cases of "acute alcoholism" treated in the Royal Infirmary from the cases of "acute alcoholism" treated in the Edinburgh police stations. No such uncertainty would affect the value of statistics of delirium tremens, and if Dr. Watson were able to give figures showing that the incidence of that disease amongst women had really risen during the last year, the "curious paradox" of which he speaks would undoubtedly merit attention. And this all the more because no parallel for it is apparently to be found anywhere in the country. In all the areas for which statistics of this kind have been published it has been the invariable rule that the decrease in arrests for drunkenness during the last 12 months has been associated with a decrease in the number of cases of delirium tremens treated in Poor-law institutions and in prisons. Nor is this observation limited to England; thus in Glasgow the number of patients treated for delirium tremens in the Eastern District Hospital and in the Govan Poorhouse during the period from mid-August, 1914, to mid-August, 1915, was 105—84 males and 21 females; while in the following 12 months i.e., subsequent to the restriction of public-house hours under the Orders of the Central Control Board, the number fell to 70—59 men and 11 women.

Dr. Watson adds that he attaches little importance to the differentiation of delirium tremens, which he regards as "merely an incident in the development of *some* cases of acute alcoholism." This seems a rather surprising statement; at all events, I do not know of a single authoritative writer on alcoholism who does not accept the view that delirium tremens is a disease arising always on a basis of *chronic* alcoholism, and further, that it occupies a quite special and distinct position amongst the alcoholic psychoses. And this is most assuredly the teaching of general clinical experience. It is, in fact, by reason of its clear relation to the chronic intoxication and its comparatively definite and unequivocal clinical characteristics, that delirium tremens is so useful for statistical purposes, especially as an index of forms of intemperance which do not find expression in public drunkenness. Thus, for example, the increase of delirium tremens under the régime of prohibition in Russia is one of the most important evidences of the development of secret drinking and of the use of dangerous substitutes, such as denatured spirit, which has followed the adoption of that extreme policy.—I am, Sir, yours faithfully,

London, Jan. 30th, 1917. W. C. SULLIVAN.

THE STATE OCTOPUS AND THE MEDICAL PROFESSION.

To the Editor of THE LANCET.

SIR,—I have read with great interest Dr. Edmund Cautley's address on the above subject published in your issue of Jan. 13th. Most of it might well have been delivered by an ardent advocate of a State Medical Service. He sees so clearly how inevitably the trend of things is towards the State assuming more and more responsibility for the health of its citizens, young and old, and he points out so well the defects of the present half-and-half system.

Though he cannot refrain from expressing his dislike of departmental officials, to whom he asserts, I think unjustly, that the interests of the profession are only of minor importance, he admits that there is no doubt that there has been an immense improvement in the control and prevention of diseases by the medical department of the Local Government Board and that good work has been carried out in its laboratories. He further admits that another set of departmental officials—the school medical officers—have done good work in securing efficient treatment for hundreds of children who would otherwise have been neglected. He might have gone further and admitted the excellent work of many other medical departmental officials. However, the point I wish to raise is whether the benefits Dr. Cautley admits to have taken place would have occurred if public health and medical inspection of school children had been left to private enterprise? The answer is obvious. Further, does the incidence of preventable diseases, the present high infant mortality-rate, and the percentage of children arriving at school age in some way physically or mentally defective (1 in 6), suggest that the present system of doctoring by private enterprise is satisfactory in its results? Surely it shows that however willing and capable individual doctors may be, the system is not one which can cope with the necessary work. If State interference and departmental officials have done much to control and prevent disease as admitted, is not the cure for these evils a still bigger dose of the same remedy?

There are many other points in the address on which I should have liked to comment, but I must not trespass further on your space. However, may I say in conclusion that I heartily agree with Dr. Cautley that it is incumbent on every member of the profession to watch and direct the current of

events. That current is flowing slowly, steadily, and unalterably towards a State Medical Service, and its strength has been intensified by the war, which has brought so prominently before the nation the importance of health and physical fitness and the urgent necessity for the preservation of child life. Let us so direct the current that, when a State Medical Service does come, it shall be one to which it will be both a pleasure and an honour to belong.

I am, Sir, yours faithfully,

London, W., Jan. 26th, 1917. CHARLES A. PARKER.

SPIROCHÆTAL JAUNDICE (SO-CALLED WEIL'S DISEASE).

To the Editor of THE LANCET.

SIR,—The admirable article, published in THE LANCET of Jan. 27th, by Captain A. Stokes, Captain J. A. Ryle, and Captain W. H. Tytler, has added very materially to our knowledge of this interesting and important disease. It seems to me that now is the time for settling the question of nomenclature, as the authors still associate Weil's name with the disease, although they mention that Martin and Pettit have recently pointed out how unjust this is, in view of the fact that it was described by several French authors, including Larrey (1800), Ozanam (1849), Monneret (1859), Laveran (1865), Lancereaux (1882), and Landouzy (1882), many years before 1886, when the Heidelberg professor published his paper. As there are certainly other forms of infectious jaundice, such as that of the Gallipoli epidemic, which was clinically quite distinct and was probably a result of infection with an organism allied to the *B. paratyphosus A*, the most suitable name seems to be the spirochætal jaundice, which has the advantage of being simpler than spirochætosis icterohæmorrhagica, suggested by the Japanese investigators. It is true that this name is not invariably quite appropriate, as the authors confirm the observations of Dawson and Hume[1] that the disease may occur without external signs of jaundice; but the name remains the most suitable of those which have been suggested, for the disease is always spirochætal in origin, and the jaundice, though inconstant, is the most characteristic symptom in the majority of cases, and appears to be constant in experimentally infected guinea-pigs.

I am, Sir, yours faithfully,

Netley, Jan. 28th, 1917. ARTHUR F. HURST.

PASSIVE HYPERÆMIA IN WOUND TREATMENT.

To the Editor of THE LANCET.

SIR,—Whilst applying Bier's method of treatment by passive hyperæmia to one of my own fingers from which the nail had been removed for a whitlow, I was impressed by the rapidity with which lymph exuded from the raw and granulating surface. This occurred within a very few minutes of the time of application of the elastic. Is not this effusion of bactericidal lymph precisely the result aimed at in Wright's method of treating septic wounds by hypertonic saline, and, if so, would it not be worth while to use Bier's method more frequently than (so far as my limited opportunities of observing show) is the case?

I am, Sir, yours faithfully,

R. L. GAMLEN,

Brighton, Jan. 29th, 1917. Captain, I.M.S. (retired).

*** The flow of bactericidal lymph can be excited in very many ways, some being more convenient in one case and some in another.—ED. L.

[1] B. Dawson and W. E. Hume: Quarterly Journal of Medicine, 1916, x., 90.

THE COLLEGE OF NURSING, LIMITED.—Our Dublin correspondent writes: On Jan. 27th, at the Royal College of Physicians of Ireland, Miss R. C. Davies, matron of the Royal Free Hospital, London, and Miss Rundle, secretary of the College of Nursing, Limited, addressed an audience of medical men and nurses, with the purpose of explaining the objects of the College. They answered some of the objections said to have been put forward by Irish nurses, and a free discussion followed. It did not appear, however, that the Irish nurses are yet satisfied as to the wisdom of joining the College.

The War.

THE CASUALTY LIST.

THE following names of medical officers appear among the casualties announced since our last issue:—

Killed.

Capt. H. L. Jarman, R.A.M.C., attached S. Wales Borderers, *Lost in H.M.S. "Laurentic."*

Surg. F. E. Rock, R.N., was a student at Middlesex Hospital, and qualified in 1893. He was at one time assistant medical officer of health at Huddersfield, and, previous to rejoining the Royal Navy after the outbreak of war, he held the position of assistant medical officer of health and assistant school medical officer at Edmonton.

Wounded.

Lieut. J. A. Noble, R.A.M.C.
Capt. M. A. McDonald, R.A.M.C.

DEATHS AMONG THE SONS OF MEDICAL MEN.

The following sons of medical men must be added to our lists of those who have fallen during the war:—

Second Lieut. J. A. E. Frend, R.F.A., eldest son of Dr. J. A. Frend, of Rosario, Argentine Republic, and Eastbourne, Sussex.

Second Lieut. C. H. P. Maurice, Royal Berkshire Regiment, eldest son of Lieut.-Col. W. J. Maurice, R.A.M.C.

Lieut. T. S. H. Schäfer, Northumberland Fusiliers, younger son of Professor Sir E. Schäfer, of Edinburgh University.

Lieut. A. McLintock, Duke of Wellington's West Riding Regiment, second son of the late Dr. J. McLintock, F.R.S., of Edinburgh.

THE HONOURS LIST.

The following awards to medical officers are announced:—

Distinguished Service Order.

Temp. Capt. Dyfrig Huws Pennant, R.A.M.C., attached Headquarters, R.F.A.

For conspicuous gallantry and devotion to duty. He dressed and remained with three wounded men under the most intense fire. He has at all times set a splendid example of courage and coolness, and has on many occasions done fine work.

Military Cross.

Lieut. Daniel Davies Evans, R.A.M.C. (Spec. Res.), attached Royal Dublin Fusiliers.

For conspicuous gallantry and devotion to duty. He displayed great courage and determination in collecting and attending to the wounded under very heavy fire.

Temp. Capt. Rupert Farrant, R.A.M.C., attached Shropshire Light Infantry.

For conspicuous gallantry and devotion to duty. During the whole day he tended wounded in an open trench which was subjected to a violent bombardment. On one occasion he led a party into "No Man's Land" and brought in several wounded men.

Temp. Capt. Frank Anthony Hampton, R.A.M.C., attached Royal Scots.

For conspicuous gallantry and devotion to duty. He continually went out under very heavy fire and remained in the open attending to the wounded with the utmost bravery and coolness. He has previously done fine work.

Temp. Capt. John Samuel Levis, R.A.M.C.

For conspicuous gallantry and devotion to duty. He displayed great courage and determination when in charge of stretcher-bearers under heavy fire. He has on many previous occasions done fine work.

Temp. Capt. Francis Cromby Macaulay, R.A.M.C.

For conspicuous gallantry and devotion to duty. He displayed great courage and determination in collecting and attending to wounded under very heavy fire.

Temp. Capt. Philip Hugh Rawson, R.A.M.C., attached South Staffordshire Regiment.

For conspicuous gallantry in action. On several occasions he rescued wounded men under very heavy fire. He set a fine example of courage and coolness throughout.

Temp. Surg. George Lee Ritchie, R.N., attached Royal Naval Division.

For conspicuous gallantry and devotion to duty. He displayed great courage and determination in collecting and attending to the wounded under very heavy fire.

Capt. Arthur Ashton Smalley, R.A.M.C. (Spec. Res.).

For conspicuous gallantry and devotion to duty. He displayed great courage and determination in attending to the wounded, working continuously for 48 hours under heavy fire. He set a fine example throughout.

Temp. Surg. Geoffrey Sparrow, R.N., attached R.N.D.

For conspicuous gallantry and devotion to duty. He displayed great courage and determination in collecting and attending to the wounded under very heavy fire.

Capt. Wilmot Fenwick, Aust. Med. Corps.
For conspicuous gallantry and devotion to duty. He worked continuously for 48 hours under very heavy fire tending and dressing the wounded. He set a splendid example of coolness and courage throughout.

The *London Gazette* states that the award of the Military Cross to Temp. Capt. Francis John Morris, R.A.M.C. (announced in THE LANCET of Jan. 6th, p. 38), is cancelled, and the following is substituted: Capt. John Morris, R.A.M.C. (T.F.), attached Cheshire Regiment.

MENTIONED FOR DISTINGUISHED SERVICES.

The names of the following medical officers have been brought to the notice of the Secretary of State for War for distinguished services rendered in connexion with the war:—

Lt.-Col. H. G. Barling, R.A.M.C.; Lt.-Col. H. P. W. Barrow, R.A.M.C.; Lt.-Col. A. W. Browne, R.A.M.C., ret.; Lt.-Col. H. E. B. Bruce-Porter, R.A.M.C.; Col. Hon. W. E. Collins, N.Z. Med. Corps; Lt.-Col. H. Davy, R.A.M.C.; Surg. Lt.-Col. P. J. Freyer, I.M.S., ret.; Capt. P. J. Gaffikin, R.A.M.C.; Lt.-Col. G. M. Goldsmith, R.A.M.C.; Maj. G. L. Gulland, R.A.M.C.; Lt.-Col. H. A. Haines, R.A.M.C.; Col. W. H. Horrocks, A.M.S.; Lt.-Col. C. J. Jacomb-Hood, R.A.M.C.; Temp. Col. R. Jones, R.A.M.C.; Surg.-Gen. W. W. Kenny, late R.A.M.C.; Lt.-Col. Sir W. Arbuthnot Lane, Bt., R.A.M.C.; Col. D. J. MacKintosh, M.V.O.; Lt.-Col. W. J. Macnamara, R.A.M.C.; Temp. Lt.-Col. Sir T. Myles, Knt., R.A.M.C.; Col. E. North, late R.A.M.C.; Lt.-Col. T. H. Openshaw, C.M.G., R.A.M.C.; Lt.-Col. W. W. Pope, late R.A.M.C.; Capt. W. A. Robertson, R.A.M.C.; Lt.-Col. G. B. Stanistreet, R.A.M.C.; Temp. Lt.-Col. J. Swain, R.A.M.C.; Temp. Hon. Lt.-Col. J. L. Thomas, C.B., R.A.M.C. (Maj., ret., T.F.).; Lt.-Col. T. B. A. Tuckey, R.A.M.C.; Temp. Lt.-Col. W. A. Turner, R.A.M.C.; Lt.-Col. G. E. Twiss, ret. pay, late R.A.M.C.; Maj. W. I. de C. Wheeler, R.A.M.C.

CENTRAL MEDICAL WAR COMMITTEE.

A meeting of the Central Medical War Committee was held on Wednesday, Jan. 31st, when, arising out of some correspondence, a vote of the Committee was taken as to the advisability of members of Local Medical War Committees serving on the central body. It was unanimously decided that it was an advantage to the Central Medical War Committee to have local views represented to them in a direct manner.

The Committee considered the need still existent for a large number of medical officers to serve with the Army. A valuable report from the Assessment Subcommittee and the Executive Subcommittee, dealing with the calls made on Local Medical War Committees to meet the present demands of the War Office, was placed before the Committee, when Dr. C. Buttar, chairman of the Executive Subcommittee, detailed the various sources from which officers might be obtained, mentioning the possible reduction in all estimated figures, either through rejection by the War Office as unfit for service, or through successful appeals for exemption. Colonel Blenkinsop, who was present at the meeting at the request of the Director-General of the Army Medical Service, explained how the need for medical officers in the Army was affected by sickness and wounds, wastage and resignations, and indicated the places at which officers were at the moment urgently needed. An interesting discussion showed that the work of the Central Medical War Committee had been very strenuous and thorough, but that the demands of the medical profession will for some time remain pressing.

Medical Examination of Medical Men under 41.

The Central Medical War Committee is receiving many inquiries from medical men who come within the terms of the Military Service Acts as to the meaning of a request they have received from the military authorities to present themselves for medical examination. This request need not give rise to any misgiving. The position of enrolled men is not affected by it, for the question of whether they will be required to accept a commission in the Royal Army Medical Corps or not is one to be settled by the Central Medical War Committee in consultation with the Local Medical War Committee concerned. So much delay has, however, been caused in connexion with past calls by the uncertainty as to whether the men warned as being likely to be called for service were or were not physically fit that the War Office has decided to have all the doctors of military age examined and to have the question of physical suitability settled. Medical men receiving such a notice from the military authorities must comply with it, but need take no further steps until they hear from the Local or the Central Medical War Committee that any other steps are needed.

THE TRANSFERENCE OF THE TRAINING ESTABLISHMENT OF THE ROYAL ARMY MEDICAL CORPS.

We understand that it has been decided to transfer the training of the Royal Army Medical Corps from Aldershot to Blackpool, the reason for the measure being the extreme pressure on the accommodation of Aldershot camp. The depôt of the Corps remains at Aldershot for the time being. The Royal Army Medical Corps has always much valued its position at Aldershot because it afforded opportunities which had been wanting at Netley for keeping in touch with metropolitan hospital practice, while propinquity was also secured to the Royal Army Medical School at Millbank. The transference of the training to Blackpool will therefore be much regretted by the Corps, and would, we feel sure, have only been made in response to the urgent need of the Army.

TREATMENT OF BURNS AND SCALDS IN THE NAVY.

Every ship in the Navy carrying a medical officer or surgeon-probationer has been recently equipped with an outfit for the paraffin treatment of burns and scalds, as have also all naval hospitals, hospital ships, and hospital trains. The paraffin preparation at present supplied is named "ambrine" by its inventor, Dr. Barthe de Sandfort, of Paris. Attention was first called to this method of treatment in THE LANCET[1] and *Times*, and Sir Arthur May, the Medical Director-General of the Navy, is to be congratulated on the promptitude with which he acted in the matter. Within a few days of the articles appearing in the journals he despatched one of his staff to Paris to investigate and report, and as a result of this report it was considered that the treatment had so much to commend it from a naval point of view, that no time should be lost in putting it in the hands of the medical staff of the Navy. And no better opportunity can be imagined for a thorough test of the efficiency of the treatment, as it is well known that burns and scalds form a good proportion of the injuries met with on board ship, not only during war but also in times of peace.

Not only did Sir Arthur May obtain the necessary information promptly, but the form in which he placed "ambrine" at the disposal of medical officers has given the treatment the best possible chance. The outfit, which we have seen in use, is neat and compact, and consists of a supply of the "ambrine," a small brush, a sprayer and bellows, together with clear and precise instructions for use, the whole being contained in a portable wooden box labelled "Dressings of Burns by Paraffin Wax." The methods of use, technique, cannot be better described than in the words of the printed instructions contained in each box, which are based on the teaching of the inventor of "ambrine" and which we quote verbatim:—

DRESSINGS OF BURNS BY PARAFFIN WAX.

The substance contained in this outfit is a mixture of paraffin and resins, and is termed by its inventor "Ambrine." It is solid when cold and becomes fluid when heated to 140°-150° F. It can be used as a "first-aid" dressing for burns and for their subsequent treatment if considered desirable. The originator of the preparation advocates its use for all classes of burns and employs it through the whole stage of treatment, and he claims that by so doing he has had excellent results.

Methods of Use.

(*a*) *Heating.*—Place a piece of the wax in the sprayer provided, and heat the latter over a spirit lamp, or set it in a basin containing a little water which should be kept boiling for ten minutes.

(*b*) *Precautions to be taken.*—Care should be taken to prevent any water getting into the wax. It must be remembered that the latter does not burn the tissues at 176° F., but the smallest quantity of water present would cause scalding. With the same end in view, the burnt area should be gently dried before the application is made. While the above is being heated, prepare a few fine layers of absorbent cotton; these layers should be as thin as possible.

(*c*) *The dressing.*—When the wax is in a liquid state and has been allowed to cool to a temperature of, roughly, from 140° to 150° F., it can then be applied to the burnt area either by means of the spray or the brush supplied for the purpose, or by the sprayer followed by the brush. If the sprayer is used the metal should be heated all over (including the nozzle), as any coagulation of the wax at this point will interfere with the proper working of the instrument.

The flame should be kept from the wooden handle and rubber bellows.

As regards the technique.—The sprayer is first held about 9 inches from the patient, and the area is sprayed over until it has the appearance of being covered with a thin layer of hoar-frost. The sprayer is now brought closer (say 3 to 4 inches) and the bellows briskly worked; it will then be seen that in the centre of this spray-stream the wax assumes a liquid appearance. With this liquid spray the whole of the affected part is now quickly covered. A thin layer of cotton-wool is next laid on this wax, and the whole is then again covered with the liquid wax, by the brush. It is strongly recommended that the surgeon

[1] THE LANCET, June 10th, 1916, p. 1187.

should first try the method by applying two or three dressings to his own hand or arm.

Note.—When removing the lid from the sprayer do not hold it by the handle (as the leverage may buckle the side of the instrument). It should be held by the body of the sprayer, using a cloth if the metal is hot.

When using the brush.—Remove the lid of the sprayer, take the brush provided, and dip it in the liquid. Now spread the latter over the wound without pressing—that is, as much as possible dabbing it and not brushing it on; this operation is repeated until the glazing is complete, taking care to leave no spot uncovered. Immediately afterwards place quickly on this first wax glaze one of the thin layers of absorbent cotton, already prepared as explained above, and then, with the same dabbing movement, put on several more applications of the fluid.

If the wound is extensive the operation is done on small square surfaces successively and close together (about 4 by 4 inches). These little squares thus become part of one another.

After the preparation (which with cotton-wool forms a shell or casing) has been allowed to cool, dressings and bandages can be applied in the usual manner. The initial use of the sprayer is recommended where the area is painful.

Removing the dressing.—For the first few days the waxen shell must not be left in place more than 24 hours; later, if it is decided to still employ it as a dressing, it can be left for 48 hours, or even longer.

To remove the dressing, untie the bandages and expose the "shell." An incision is made in the latter by means of a blunt knife or scissors, and the whole is peeled off. The wound is afterwards bathed with boiled water and the cleansing is further perfected by washing with absorbent cotton soaked in boiled water. Then it is dried either by a current of warm air or by a piece of cotton-wool, care being taken not to rub, or cause the granulations to bleed.

Antiseptic solutions should not be used (except very weak) and care should be taken not to apply the liquid at a temperature of more than 150° F.

Heating the wax in a bath of boiling water raises its temperature to nearly 212° F.; therefore before applying it to the burn, *with the brush*, it should be removed from the water bath and allowed to stand for a minute or two, so as to reduce its temperature to below 150° F.

It is claimed for the application that:—

(1) It immediately alleviates pain.

(2) It constitutes a warm "shell" under which the tissues are protected against outside contamination, and are, as it were, "splinted."

(3) It can be removed without pain or injury to the newly forming tissues, and thus limits the formation of scar tissue.

If the directions are followed, the dressing of burns by paraffin wax becomes a straightforward and even simple routine; and all who recall the agony undergone by the burnt patient at the hands of experienced people trying to remedy the condition according to the usual technique, will recognise that we are bestowing high praise.

The initial use of the sprayer is considered necessary in painful cases, and desirable in practically all, not only for its very soothing effects, but also because the injured area is first covered in thereby by a fine sterile coating and contamination by direct contact with the brush, which even with the best intentions it may be difficult to keep clean, is avoided.

The inventor of "ambrine"—Dr. Barthe de Sandfort—has used it for treatment of burns and scalds at the Hospital St. Nicolas, Issy-les-Molineaux, for some time past, and there can be no doubt with a good deal of success. He applies it all through from the very beginning, only finishing when sound healing has taken place, and has had good results with very severe burns even of the third degree. The newly formed skin is generally found to be soft and supple, scarring is greatly diminished or absent, and recovery is accelerated.

The results of the trials with "ambrine" now being carried out in the Navy in accordance with Sir Arthur May's instructions will be awaited with interest by the profession at large.

THE RED CROSS.—The County of London Red Cross Fair at the Central Hall, Westminster, will be opened on Feb 15th by Princess Patricia of Connaught.—A cheque for £430 6s 7*d*. has been received by the Joint War Committee of the British Red Cross Society and the Order of St. John from Sir Frederick Ponsonby, Keeper of His Majesty's Privy Purse, the proceeds of the sale of venison from the King's estates, which His Majesty directed should be given as a donation to the Red Cross funds.—The annual report of the Gloucestershire branch of the Red Cross Society shows that at present there are 22 Voluntary Aid hospitals with 2200 beds in the county. 16 800 patients have passed through these institutions since the commencement of the war.—Up to Dec. 31st last 53 450 loaves had been despatched to British prisoners of war in Germany by the depôt at Copenhagen under the control of the Red Cross.

AMBULANCES FOR THE BALKANS.—On Jan. 30th 17 ambulance cars, fully equipped, which have been presented to the London Committee of the French Red Cross by Sir Lucas Ralli, senior partner in the firm of Ralli Bros., were inspected in Hyde Park by the French Chargé d'Affaires (M. Picot). The cars comprise a full ambulance unit, and will be under the command of Major L. Lyon Clark (late North Devon Hussars).

THE BATHS OF SIDMOUTH (DEVON).—At the recent annual meeting of the Sidmouth Baths Company the chairman stated that alterations and additions were to be made in the equipment of the baths in order to enable wounded officers to have special treatment. The War Office had approved of the scheme and would defray the necessary cost.

THE WOUNDED ALLIES RELIEF COMMITTEE.—The Committee is presenting to the Queen of Roumania, through Madame Misu, wife of the Roumanian Minister in London, drugs and surgical instruments to the value of £500, for the benefit of sick and wounded soldiers of the Roumanian Army.

THE Senate of London University consider it advisable in the national interest to permit matriculated students to continue their studies until the age of 18 years and 8 months, or even 19 years, provided that they receive suitable military instruction for some hours weekly. Their resolution to this effect has been sent to the War Office and to the Board of Education.

Medical News.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—At the First Professional Examination for the Licence in Dental Surgery held on Jan. 25th and 26th the following candidates were successful:—

Mechanical Dentistry and Dental Metallurgy.—Leonard Harry Brauber, Bristol University; and William Henry Turner, Guy's Hospital.

Mechanical Dentistry.—Myer Isaac Benischowitz, Royal Dental Hospital; Christopher Egbert George Busbridge, National Dental Hospital; Herbert William Hill and Wallace Inman, Royal Dental Hospital; Herbert Myers Marshall, Guy's Hospital; Edith Mynott Norman National Dental Hospital; Hubert John Sanders, Bristol University; and Stanley Vernon White, Guy's Hospital.

Dental Metallurgy.—Ralph Martin Ealand, Bristol University; and Arthur Douglas Ray, Manchester University.

ROYAL COLLEGE OF PHYSICIANS OF LONDON.—A Comitia was held on Jan. 25th, Dr. Frederick Taylor, the President, being in the chair.—Dr. V. B. Green-Armytage having passed the necessary examination was admitted a Member of the College. Eighty-three candidates having passed the requisite examinations were granted Licences to practise physic.—Diplomas in Public Health were granted conjointly with the Royal College of Surgeons of England to the following candidates: Dr. G. E. Beaumont, Oxford, Middlesex, and University College; Dr. V. Borland, Glasgow and University College; Mr. S. F. Chellappah, Ceylon and King's College; Dr. Una Griffin, Royal Free and University College; Mr. S. H. Paul, Charing Cross and King's College; and Dr. Mary A. van Ingen, Royal Free and University College.—Dr. J. Michell Clarke, Dr. W. E. Wynter, Dr. James Taylor, and Dr. Herbert Spencer were elected councillors.—Sir Francis Champneys was re-elected a Representative of the College on the Central Midwives Board.—Dr. Newton Pitt was elected a Representative Governor of the University of Bristol in place of Sir William Church, who had resigned.—Sir Dyce Duckworth was re-elected a Representative of the College on the Council of Queen Victoria's Jubilee Institute for Nurses.—The President stated that he had taken part in a deputation to the President of the Local Government Board, at the invitation of the Association of Municipal Corporations, urging that unqualified practitioners should be prevented from undertaking the treatment of venereal diseases.—The President also announced that he had appointed Professor R. Saundby to be Harveian Orator, and Dr. E. S. Reynolds to be Bradshaw Lecturer for this year, and that the Council had appointed Dr. T. M. Legge to be Milroy Lecturer for 1918.—A report was received and adopted from the Representative of the College on the General Medical Council (Dr. Norman Moore) concerning the meeting of the Council held in November last.—A report was received and adopted from the Committee of Management recommending that Rugby School, which is already recognised for instruction in chemistry and physics, should also be recognised for instruction in biology.

RÖNTGEN SOCIETY.—A general meeting of this society will be held on Tuesday next, Feb. 6th, at 8.15 P.M., at the Institution of Electrical Engineers, Victoria Embankment, W.C. Ordinary meetings of the Society will be held

at the same time and place on the following Tuesdays: Feb. 6th, March 6th, April 3rd, May 1st, and June 5th. Members desirous of reading papers or exhibiting apparatus are requested to communicate with the honorary secretaries at the earliest possible date.

Mr. George Gidley, of Ashburton, Devonshire, died recently in his 102nd year.

Dr. William Fookes Thompson has been placed upon the commission of the peace for the borough of Launceston (Cornwall).

Professor C. S. Sherrington will deliver a discourse on "Recent Physiology and the War" at the Royal Institution this (Friday) evening in the place of Dr. Charles Carpenter.

Major John Bruce, R.A.M.C., will give a short lecture and demonstration at the Dermatological Section of the Royal Society of Medicine on Thursday, Feb. 15th, at 5 P.M., on "The Treatment of Scabies with Sulphur Vapour."

SCOTTISH POOR-LAW MEDICAL OFFICERS' ASSOCIATION.—The committee in their report for the year 1916 state that owing to the scarcity of medical men a number of vacancies have not been filled up, although parish councils have advertised the appointments as open to women. Correspondence with the Highlands and Islands Medical Service Board had led to the discovery that the board did not, as was supposed, guarantee to all medical officers in the Crofting Counties a position including: (1) a suitable dwelling-house, rent free; (2) the necessary outlays in connexion with the working of the district; (3) a minimum income of £300 a year. The committee therefore proposed to return to their old position of warning applicants not to go blindfold into a district where the arrangements as regards income, area, and facilities might be unsatisfactory. The annual meeting of the Association will be held in the St. Enoch Hotel, Glasgow, to-day, Friday, Feb. 2nd, at 4.30 P.M.

Appointments.

Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET *Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.*

CUMMING, J., M.B., C.M.Glasg., has been appointed Certifying Surgeon under the Factory and Workshop Acts for the Hull District of the county of Yorks (East Riding).

GARMAN, J. M., M.R.C.S., L.R.C.P. Lond., Medical Officer for the Sellinge District of the Elham Union.

IRONSIDE, EVA CONSTANCE, M.B., Ch.B.Aberd., Deputy Medical Officer of Health for the Buckfastleigh (Devon) Urban District Council and Acting Public Vaccinator for the Buckfastleigh District of the Totnes (Devon) Union

LANGRAN, WILLIAM, L.R.C.P., L.R.C.S., L.M. Edin., L.A.H. Dub., Commandant, and LUMSDEN, HARRY FOOTE, M.B., Ch.B. Edin., RAMSDEN-WOOD, WILLIAM EDWARD, M.D. Cantab., RICHARDS, NORMAN LLOYD, L.R.C.P., M.R.C.S., Medical Officers to the V.A.D. Hospital, Rhode Hill, Uplyme, Devon.

SHARPLEY, E., M.D. Durh., Certifying Surgeon under the Factory and Workshop Acts for the Louth District of the county of Lincoln.

Vacancies.

For further information regarding each vacancy reference should be made to the advertisement (see Index).
When the application of a Belgian medical man would be considered the advertisers are requested to communicate with the Editor.

BARNSLEY, BECKETT HOSPITAL AND DISPENSARY.—House Surgeon. Salary £200 per annum, with board, &c.

BATH WINSLEY SANATORIUM.—Assistant Resident Medical Officer. Salary £250 per annum, with board, &c.

BOLESKINE AND ABERTARFF, PARISH COUNCIL OF.—Medical Officer (and Vaccinator), &c. Salary between £350 and £400 per annum.

BOLTON INFIRMARY AND DISPENSARY.—Female Second House Surgeon. Also Female Third House Surgeon. Salaries £200 and £180 per annum respectively, with board, &c.

BRISTOL GENERAL HOSPITAL.—House Surgeon for six months. Salary at rate of £175 per annum, with board, &c.

CARDIFF, KING EDWARD VII.'S HOSPITAL.—House Surgeon for six months.

DERBYSHIRE ROYAL INFIRMARY, DERBY.—House Physician and Casualty Officer. Also Resident Anæsthetist. Salaries £200 per annum, with board, &c.

EDMONTON MILITARY HOSPITAL, LONDON, N.—Medical Officers. Salary at rate of £1 per day and keep.

ESSEX, ADMINISTRATIVE COUNTY.—Tuberculosis Officer. Salary £500 per annum.

GRIMSBY AND DISTRICT HOSPITAL.—House Surgeon. Salary £5 5s. per week, with board, &c.

GUILDFORD, ROYAL SURREY COUNTY HOSPITAL.—House Surgeon. Salary £200 per annum, with board, &c.

HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST, Brompton.—House Physician for six months. Salary 30 guineas.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.—House Surgeon, Assistant Casualty Medical Officer, and House Physician, unmarried. Salary at rate of £60 per annum each, with board, &c.

HOSPITAL FOR WOMEN, Soho-square, W.—Female Resident Medical Officer for three or six months. Salary £80 per annum, with board, &c.

KENT EDUCATION COMMITTEE.—Temporary School Medical Inspector and Medical Officer of School Clinic. Salary at rate of £350 per annum.

LEAMINGTON SPA, WARNEFORD AND SOUTH WARWICKSHIRE GENERAL HOSPITAL.—Second Resident Medical Officer. Salary £200 per annum, with board, &c.

MAIDSTONE, WEST KENT GENERAL HOSPITAL.—Senior House Surgeon. Salary £250 to £300 per annum and all found.

MANCHESTER ROYAL INFIRMARY.—Resident Medical Officer. Salary £225 per annum, with board, &c.

NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC, Queen-square, W.C.—Female Co-examiner to School of Massage.

NORTHERN MUNITIONS FACTORY.—Female Assistant Medical Officer. Salary £400 per annum.

NOTTINGHAM AND MIDLAND EYE INFIRMARY.—Female Resident House Surgeon. Salary £120 per annum.

PORTREE, Island of Skye.—Parish Medical Officer and Public Vaccinator. Salary about £480 per annum.

ROTHERHAM HOSPITAL.—Junior House Surgeon. Salary £150 per annum, with board, &c.

ST. MARK'S HOSPITAL, City-road, E.C.—House Surgeon. Salary as arranged, with board, &c.

ST. PETER'S HOSPITAL FOR STONE, &c., Henrietta-street, Covent Garden, W.C.—Junior House Surgeon for six months. Salary at rate of £75 per annum, with board, &c.

SALFORD ROYAL HOSPITAL.—Honorary Physician for Diseases of the Skin.

SHEFFIELD UNION HOSPITAL, Firvale.—Female Resident Assistant Medical Officer. Salary £250 per annum, with rations, &c.

STAFFORDSHIRE EDUCATION COMMITTEE.—Female Assistant School Medical Inspectors. Salaries at rate of £400 per annum.

SUNDERLAND ROYAL INFIRMARY.—Female House Surgeon. Salary £150 per annum, with board, &c.

UNIVERSITY OF LONDON.—External Examiners.

WELSH METROPOLITAN WAR HOSPITAL, Whitchurch, near Cardiff.—Resident Medical Officer.

WIGAN, ROYAL ALBERT EDWARD INFIRMARY AND DISPENSARY.—Resident Surgical Dresser.

THE Chief Inspector of Factories, Home Office, London, S.W., gives notice of a vacancy for a Certifying Surgeon under the Factory and Workshop Acts at Cleobury Mortimer, Salop.

Births, Marriages, and Deaths.

BIRTHS.

ARCHER.—On Jan. 23rd, at Monckton-road, Alverstoke, Hants, to Ada Caroline, wife of Charles W. Archer, F.R.C.S., Temporary Surgeon, R.N.—twin daughters.

HURRY.—On Jan. 25th, at Berry Lodge, Shoreham-by-Sea, the wife of Captain H. R. Hurry, R.A.M.C., of a son.

PATTISON.—On Jan. 26th, at The Cottage, Hollow Meadows, Sheffield, the wife of C. Lee Pattison, M.B., B.S. Lond.,—a daughter.

STEVENSON.—On Jan. 26th, at Burpham House, Fareham, Hants, the wife of W. Sinclair Stevenson, M.D., of a son.

MARRIAGES.

BREWITT-TAYLOR—ELLIS.—On Jan. 27th, at Rosslyn Hill Chapel, Hampstead Raymond Brewitt-Taylor, M.B., younger son of C. H. Brewitt-Taylor, of China, to Evelyn, youngest daughter of Henry Ellis, of Potter's Bar.

RAFFLE—MONRO.—On Jan. 24th, at S. Michael's Church, South Shields, Captain Wilfrid Raffle, R.A.M.C., attached Coldstream Guards, to Nora, only daughter of Mr. and Mrs. Charles Monro, Hampstead, N.W.

ROMER—WILLIS.—On Jan. 25th, Harry Romer, M.A., M.B., B.Ch. Oxon., L.R.C.P., M.R.C.S. Eng., to Clara Lillian, second daughter of the late Mr. Newman Willis, of Finedon, Northants.

VERTUE—WALLACE.—On Jan 3rd, at St. Saviour's Cathedral, Southwark, Lieutenant Henry St. Hill Vertue, R.A.M.C., to Clementina Margaret, daughter of the late Rev. W. J. Wallace, formerly Rector of Mount Mellick, Queen's County, and of Mrs. Wallace, Albert-road, Sandycove, Co. Dublin.

DEATHS.

FARR.—On Jan. 26th, suddenly, at Heath House, Andover, Ann Lawrance Augusta Martel, the most dearly loved wife of Ernest A. Farr, J.P., and only daughter of the late Major-General and Mrs. I. L. Bolton, of La Chasse, Jersey.

HUMPHREYS.—On Jan. 16th, at Richmond, Surrey, Henry Humphreys, M.A., M.D. Cantab., M.R.C.P., late Fellow St. John's College, Cambridge, aged 72 years.

SANDIFER.—On Jan. 28th, Henry Stephen Sandifer, M.D., F.R.C.S., of Dawson-place, W., aged 51 years.

WILKINSON.—On Jan. 25th, at The Maples, Blackheath, S.E., Francis Tichborne Wilkinson, Lieutenant-Colonel, R.A.M.C. (retired), aged 59 years.

N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Short Comments, and Answers to Correspondents.

PUBLIC HEALTH IN NEW SOUTH WALES.

THE most important matters connected with public health administration in New South Wales during 1914 are dealt with in the report by Dr. Robert T. Paton, the Director-General of Public Health for the State, recently issued (Sydney: W. A. Gullick, Government Printer, 1916, price 7s.). Disposal of refuse, the working of the Pure Food Act of 1908, the standardisation of Australian manufactured food products, supervision of the meat-supply, treatment of tuberculous patients in State sanatoria and by special dispensaries, and fresh legislative measures for checking the spread of disease (including notification) and anti-typhoid inoculation are the chief subjects considered in this report. Further details are given in a series of departmental reports. Great care is taken in the inspection of foodstuffs; it was found necessary in many cases to take drastic action, condemn, and destroy large quantities that were totally unfit for human consumption; amongst other things, 53 tons of dried fruit, found to be riddled with insects, were seized and condemned. Dairies and slaughter-houses are inspected under the Public Health Act, but owing to the limited staff can only be visited once in eighteen months. The supervision of the meat export trade is of great importance to the State (as well as to the enormous numbers of persons in the United Kingdom who derive the greater part of their meat-supply from this source). During 1914 there were 437,429 packages of canned meats, and 1,925,756 carcasses of mutton and lamb exported, besides large quantities of beef, veal, and meat extracts. The health authorities in Europe and in the United States require a high standard for the inspection and sanitary handling of the meat exported from the Commonwealth. By an arrangement with the Commonwealth Government a few years ago all inspections of meat in New South Wales were handed over to the Public Health Department of the State; the work is carried out by an experienced veterinary surgeon, assisted by fifteen inspectors. Meat for home consumption is inspected in a similar manner. The prevention of venereal diseases and tuberculosis receives special attention; for the former it is recognised that the provision of adequate and easily accessible means of treatment is the only method by which the affected persons can be secured from the more disastrous effects of these diseases, and other persons protected from contracting infection. Two night clinics have been opened, the numerous attendances at which have demonstrated the absolute necessity of taking special steps in this direction. For combating consumption nurse-inspectors are provided to visit and advise patients as soon as their condition comes to the knowledge of the health department; the cases are then classified into (*a*) those that can be cared for in their own homes and are well enough to attend the dispensaries; (*b*) those requiring removal to a sanatorium; (*c*) those in whom the disease is so far advanced as to render permanent medical care and maintenance necessary. The principal State sanatorium at Waterfall contains 370 beds; in addition at the Rookwood State Hospital there is accommodation for 100 male patients. It is intended to erect pavilions at Waterfall for the reception of an additional 100 males and to withdraw tuberculosis cases from Rookwood. The death-rate from pulmonary consumption has decreased most notably during recent years; in 1885 it was 1163 per million, in 1913 it was 669. Anti-typhoid inoculation has been carried out in the case of all troops leaving for active service in Europe or elsewhere since the beginning of the war, two inoculations having been given to about 18,000 men and vaccine supplied sufficient to protect a further 50,000. Only four persons were found to be suffering from leprosy during 1914. A considerable number of the Public Health staff—some 20 in all—were called up for military duty during the year; much work was also carried out by the medical officer of the department in advising the military authorities in regard to camp sanitation, examination of food-supplies, &c. The report by Dr. J. Burton Cleland on work done in the Bureau of Microbiology is a record of nearly 20,000 examinations, micro-biological, pathological, and medico-legal, as well as of investigations into various special subjects by the director and his assistants. Numerous illustrations, charts, and diagrams add to the value of this record of public health progress in New South Wales during 1914.

THE PREVENTION OF VENEREAL DISEASES.

To the Editor of THE LANCET.

SIR,—Now that the experiments of Metchnikoff and Roux in 1904 upon apes have confirmed the practice of M. Cumanus, who, in 1495, recommended the use of mercurial ointment in the prevention of syphilitic infection, one may hope that even in England, to-day, one will not be accused of "gross precipitancy" in suggesting that all chemists will put up for sale little cases containing drug preventives against gonorrhœa, chancroid, and syphilis. Some years ago I obtained a case from a firm of chemists in Berlin, where it was being sold publicly at about two marks. Our Navy and Army Services have at last recommended it. No doubt the preventives will be a very great financial loss to doctors and chemists. One firm told me that it would mean a loss to them of about £8000 a year. Some years ago I had a large number of cases made up, and if anyone wishes to obtain a sample box for the use of males I will send one to any doctor or chemist on receipt of 5s. I have estimated that about £95,000,000 are yearly expended upon prostitution and its accompanying conditions in the United Kingdom, and if venereal diseases could be reduced even by 75 per cent. this would be a great saving to voluntary and Poor-law hospitals and in asylum expenditure.

I am, Sir, yours faithfully,

Liverpool, Jan. 29th, 1917. ROBERT R. RENTOUL.

"THE NEW HAZELL ANNUAL AND ALMANACK" AND "WHITAKER'S ALMANACK."

THESE two reference books, which every well-informed public, professional, and business man will find frequent occasion to consult, have appeared as usual in spite of the difficulties of compiling and publishing under war conditions. The first-named, which is in its thirty-second year of issue, has now become "The New Hazell Annual and Almanack," and is published by Messrs. Henry Frowde and Hodder and Stoughton at 3s. 6d. net. The scope has been extended, and besides containing recent and authoritative information concerning the British Empire and the nations of the world the Almanack contains much useful astronomical and cognate matter. Adequate space is given to the events of the war, the trade of the future, and the like, while an exhaustive index facilitates ready reference. Although appearing before the end of 1916, an inset page gives the personnel of the present Government.—"Whitaker's Almanack," appearing a week or two later, is now in its forty-ninth year, and the reader may be assumed to have a general familiarity with its contents. Owing to the increased cost of production the price has been raised from 2s. 6d. to 3s. 6d. net. Full value is given for the money in the information concerning the Government, finance, population, commerce, and statistics of the nations of the world, while the astronomical details are as complete and accurate as always. A new and important feature is a series of short articles on the industries of the British Empire, each written by an expert in his own department. A page is devoted to a summary of the efforts now being made to combat venereal diseases, and another to the progress of the past year in the field of sanitation.

THE CONSERVATIVE TREATMENT OF BURNS AND SCALDS.

To the Editor of THE LANCET.

SIR,—I notice a very valuable contribution in your issue of Jan. 27th by Mr. G. J. O'Reilly upon this subject. I have upon several occasions been in attendance upon severe cases of scalds, one notable case being when a vat of boiling sugar burst its hoops during the process of refining and severely scalded two workmen from head to foot. Upon another occasion a man became severely burnt upon the trunk, legs, arms, and face by an explosion of petrol upon a motor-launch.

In these cases, as well as in some others, I have adopted the method described by Mr. O'Reilly—viz., a large dose of opium and rest without attempting to remove the clothing. The results could not have been better.

I am, Sir, yours faithfully,

Harley-street, W., Jan. 30th, 1917. CHRISTOPHER KEMPSTER.

ANNUAL REPORTS OF THE LOCAL GOVERNMENT BOARD.

Dr. J. H. L. Cumpston, Director of Quarantine for the Commonwealth of Australia, has solicited our help in obtaining a complete set of the Annual Reports of the Local Government Board of England and Wales for the medical library at the Federal Quarantine Bureau. Prior to the publication of the present series in 1874 there were issued Annual Reports of the Medical Officer to the Privy Council, which are now of definite historical value, and it is a complete series of these earlier volumes which it is desired to obtain for the library. Dr. Cumpston states that through the courtesy of the Local Government Board he has secured a number of these volumes, but the first report and the third to ninth inclusive are missing. Any of our readers who know of the existence of copies of these reports should communicate direct with Dr. Cumpston, at the Federal Quarantine Bureau, Spring-street, Melbourne.

Æsculapius.—The description of the position may be substantially accurate; we are inclined to think that some of

the stricture is deserved, but our leading article was written precisely with the purpose of avoiding recrimination at this juncture.

W. R. B. (Newfoundland).—The outlook for the patient is not very favourable at her age. Delusions if taken at their earliest stage are often amenable to treatment. The coöperation of a competent alienist should be obtained.

W. A. W. and Others.—The interesting devices for first-aid will be likely to attract the attention of Red Cross officials and workers if exhibited in the museum of the College of Ambulance, 3, Vere-street, London, W. Application should be made to Colonel James Cantlie at that address.

COMMUNICATIONS not noticed in our present issue will receive attention in our next.

Medical Diary for the ensuing Week.

SOCIETIES.

ROYAL SOCIETY, Burlington House, London, W.

THURSDAY.—Papers:—Lord Rayleigh, O.M.: On the Dynamics of Revolving Fluid.—Prof. H. Lamb: On the Deflection of the Vertical by Tidal Loading of the Earth's Surface.—Mr. C. F. Brush and Sir R. Hadfield: Spontaneous Generation of Heat in Recently Hardened Steel.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MEETINGS OF SECTIONS.

Wednesday, Feb. 7th.

OPHTHALMOLOGY (Hon. Secretaries—Elmore W. Brewerton, Arthur W. Ormond): at 8.30 P.M.

Clinical Case:

Mr. G. Hartridge: (?) Rupture of the Optic Nerve.

Papers:

Mr. Arnold Lawson: Three Cases of Fur Infection of the Conjunctiva.

Mr. P. C. Bardsley: The Retinal Signs of Arterio-sclerosis compared with those due simply to Increased Blood Pressure.

Friday, Feb. 9th.

CLINICAL (Hon. Secretaries—David Forsyth, T. P. Legg): at 8 P.M.

Cases:

Dr. Parkes Weber: (1) Congenital Non-familial Jaundice without Splenomegaly in an otherwise Healthy Man aged 50 years; (2) Acro cyanotic Type of Sclerodactylia with commencing Generalised Sclerodermia of Face and Chest; (3) Cases of Acromegaly.

Paper:

Dr. Parkes Weber: Two Cases of Primary Cancer in the Liver in one of which Thrombosis of the Inferior Vena Cava occurred.

ROYAL SOCIETY OF ARTS, John-street, Adelphi, W.C.

MONDAY.—4.30 P.M., Cantor Lecture:—Prof. A. B. Pite: Town Planning and Civic Architecture. (Lecture II.)

WEDNESDAY.—4.30 P.M., Dr. R. F. Fox: The Future of British Spas.

RÖNTGEN SOCIETY, Institution of Electrical Engineers, Victoria Embankment, W.C.

TUESDAY.—8.15 P.M., General Meeting. Paper:—Mr. E. E. F. d'Albe: Some Properties and Applications of Selenium.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.

MONDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye. Dr. Simson: Diseases of Women.

TUESDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

WEDNESDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

THURSDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.

FRIDAY.—10 A.M., Dr. Simson: Gynæcological Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

SATURDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

ST JOHN'S HOSPITAL FOR DISEASES OF THE SKIN, 49, Leicester-square, W.C.

TUESDAY.—4 P.M., Dr. J. L. Bunch: Some Common Skin Diseases.

WEDNESDAY.—5 P.M., Dr. W. Griffith: The Pathology of Diseases of the Skin.

THURSDAY.—6 P.M., Chesterfield Lecture:—Dr. M. Dockrell: Coccus Diseases of the Skin and Hair.

ROYAL INSTITUTE OF PUBLIC HEALTH, Lecture Hall of the Institute, 37, Russell-square, W.C.

Course of Lectures and Discussions on Public Health Problems under War and After-war Conditions:—

WEDNESDAY.—4 P.M., Lecture IV.:—Lady Barrett, M.D.: The Rôle of the Midwife and the Protection of Motherhood. Prof. E. W. Hope, Miss R. Paget, Miss J. Halford, and Dr. C. Berkeley, have promised to take part in the discussion.

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METEOROLOGICAL READINGS.

(Taken daily at 8.30 a.m. by Steward's Instruments.)

THE LANCET Office, Jan. 31st, 1917.

Date.	Rain-fall.	Solar Radio in Vacuo.	Maximum Temp. Shade.	Min. Tem.	Wet Bulb.	Dry Bulb.	Remarks.
Jan. 25	...	36	32	30	31	31	Overcast
,, 26	...	43	43	29	29	29	Overcast
,, 27	...	60	35	29	31	31	Cloudy
,, 28	...	42	34	29	30	30	Cloudy
,, 29	...	39	33	29	30	30	Overcast
,, 30	...	46	34	28	30	30	Overcast
,, 31	...	40	36	30	32	32	Snowing

Other information which we have been accustomed to give in these "Readings" is withheld for the period of the war.

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